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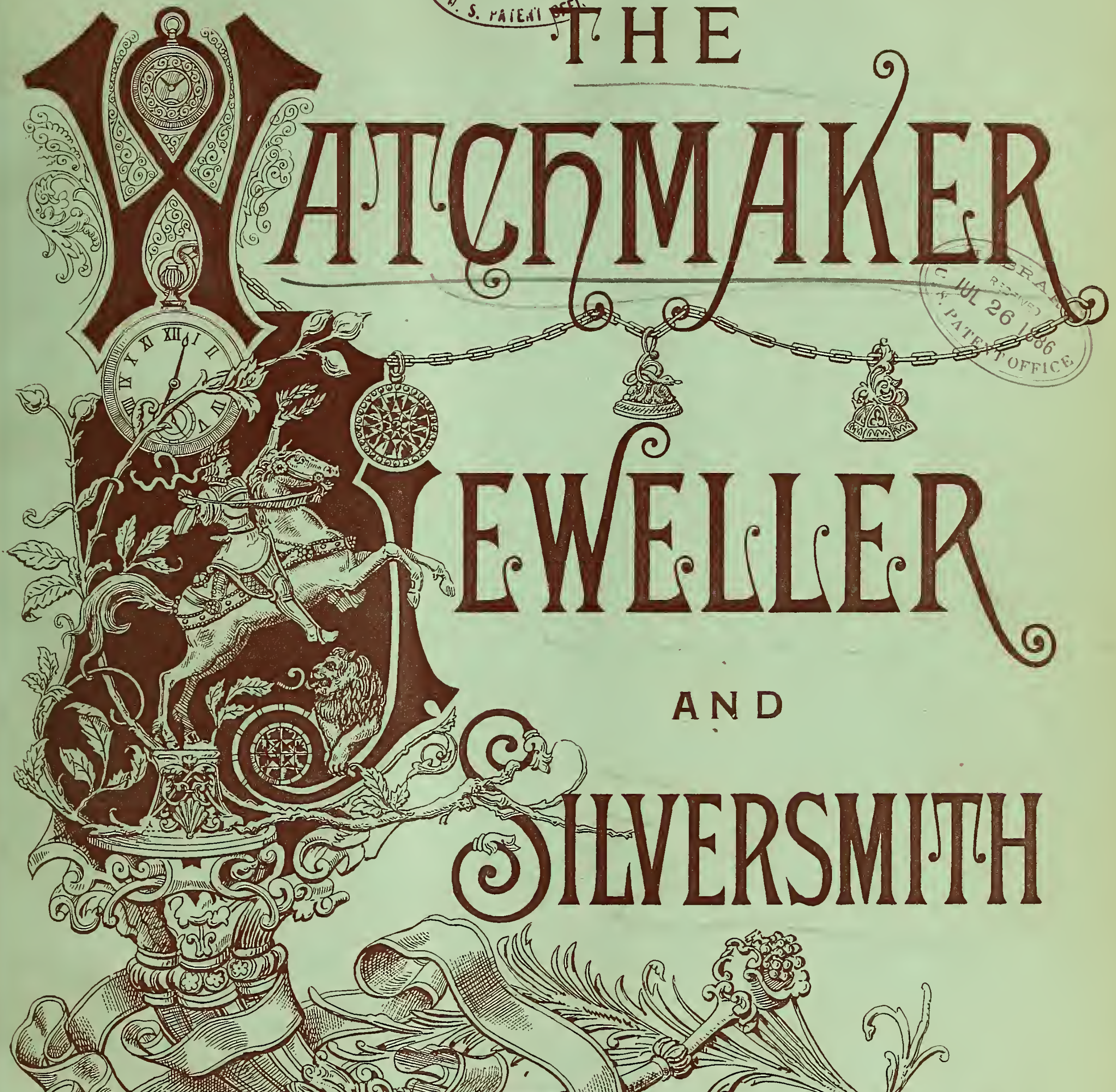

THE WATCHMAKER JEWELLER AND SILVERSMITH

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The Watchmaker, Jeweller & Silversmith.

Edited by D. Glasgow, Jun.

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The Watchmaker, Jeweller and Silversmith.

A Monthly Journal devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

Subscription.—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

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Editorial.

NOTICE.

THE Special Notice which appeared in last month's issue of *The Watchmaker, Jeweller and Silversmith*, called the readers' and advertisers' attention to the projected change in the management, and the alterations in the appearance and character of the journal which were in progress. Following the example of the Proprietors in the notice above referred to, we, as Editor, feel the desirability of not promising too much beforehand. In introducing the New Series, however, we would generally indicate the lines on which it is proposed to continue the publication.

We deem it right to state our earnest desire to keep in harmony with the established institution of the trades represented by this publication, and to avoid those personalities which tend rather to lower the tone of a journal in which they appear than to serve any useful purpose.

Against trade fallacies and abuses, however, we shall always endeavour to warn our readers, being assured that by the means of impartial criticisms true trade interests are advanced.

Special regard will be paid to workshop appliances and the requirements of the workman, and, while providing the best available matter on purely technical subjects, and endeavouring to enlarge the field from which such supplies are obtained, we propose at the same time to extend the scope of the paper by the discussion of matters of scientific and artistic interest of a more general character which (in these progressive days, in which the proceedings of the various manufacturers are so bound up with and dependent on one another) may seem to bear any relation to the trades we more especially contemplate.

By judiciously carrying out such a programme as that briefly outlined above, we trust, with the kind assistance of our readers and correspondents, to make this a thoroughly representative high-class trade Journal, in every way worthy of the support which we hope will be accorded to it.

Dr. Leonard Waldo, in his lecture at the Society of Arts, spoke of the facilities afforded by the American Patent Law for securing an inventor's rights. But, however great these may be for an American citizen, the case appears to be quite different for those without the pale of the Union, and we have before us at the present moment two letters from inventors (both of whose applications have been granted protection here and on the Continent), complaining of the manner in which they have been treated by the American Patent Office, the grounds of the refusals being apparently very trivial, and the objections raised utterly irrelevant to the claims in question.

Perhaps the report to Congress issued by Mr. V. Montgomery, the Commissioner, published in the beginning of this year, in which he complains of the inadequate accommodation, and urgently asks for a more numerous and efficient staff of assistants, is a sufficient, although not a very satisfactory, explanation of the state of things with which our correspondents express their discontent.

The case of Birkett *v.* Larard, an account of which we publish in another column, is one of considerable importance to watchmakers. Apart from other aspects of the case, the moral pointed seems to be that one must not take the law into one's own hands.

During the big gooseberry season last year considerable interest was manifested by the newspaper men in the remarkable behaviour of a compass on an Irish mail boat. The behaviour, it will be recollected, was found to be due to the presence, in the hand of a passenger, of a magnetized umbrella. The steel ribs of the umbrella had got magnetized by being near a dynamo most probably—*hinc illae lachrymae.* Again we are hearing about compasses becoming erratic owing to the fact that Tom Bowling is addicting himself to the wearing of anti-rheumatic "magnetic appliances," and good old women of both sexes are exercising themselves about the matter. Now a new trouble is upon us. Ladies are warned against wearing corsets with steel in them. If they do, they are told the steel may become magnetic, and then their watches will go badly or not go at all.

Self-Winding and Synchronizing Clock Company, Limited.—We visited one day last week the offices of the Self-Winding Clock Company, at Leadenhall Buildings. We saw and examined carefully the clocks of the Company and the diagrams showing the electrical methods for synchronizing a number of clocks. We found little that was quite novel, but a good deal that was well worked out. The main feature of the clocks is the means employed for periodically winding them up. The clocks have only a light spring for driving purposes, and being often wound, it is claimed that the driving power remains practically constant, while another advantage is gained in the elimination of powerful springs or heavy weights. The means for winding the clock periodically (in practice once an hour) may be thus described. Suppose the clock to be already going, at a specified time it will happen that a small ivory press-button will travel to and press upon a spring connected with one pole of a battery (in practice a single Leclanché cell) so that it touches and makes electrical contact with a metallic piece, connected through the electro-magnets of a small electric-motor, of a very simple type. The electro-magnets being in the path of the current, so closed through them, become energized and cause the armature to rotate. The axle of the armature carries a toothed wheel which engages with a larger toothed wheel whose motion winds up the spring. This being accomplished, the current is then again automatically broken, and the clock continues to go, by virtue of the work done by the current in rotating the armature. The clock is therefore electrically driven, but only in the same sense that an ordinary clock is manually driven. A clock which should be wound up once an hour by hand would keep just the same time as the electrically wound clocks. So far therefore as we have seen there is in the new clock merely an automatic arrangement for re-winding. Clocks of this kind then can have no pretensions to being better time-keepers then any other clocks, and indeed their time-keeping qualities will probably be on a par with those of cheap American clocks. But it is proposed that these cheap clocks have their time corrected, say, once an hour. To effect this a small addition of a "relay" is made to each clock. At specified times, a standard clock automatically closes circuit through the "relays" of its affiliated clocks. The correcting current merely energizes the relays; the current from the local batteries is employed for the actual work required in putting back or bringing forward the hands. As we have before said, we see nothing that is distinctly novel in all this. Clocks have been periodically wound up by electricity before, and the bringing forward or retarding of the hands of a clock has been practised from the earliest times of electrical clocks. What pleased us particularly was the adequacy of the arrangements, and the simplicity of the means employed. The little motor (which by the way is made on the type of the earliest electric-motors of all) is elegant and neat in the extreme. A plan for preventing sparking at the commutator, by means of high resistance shunts, struck us as fulfilling its design very well. The motor did not seem at all distressed at its work, though it was run from a single Leclanché cell, and the time it requires to work, about six seconds, precludes the battery from becoming polarized to any perceptible degree. On the whole, we were favourably impressed with the clocks, and we do not doubt the statements made as to the lasting power of the batteries, as we have had personal experience of Leclanché cells doing much more work than that required from the batteries of the self-winding clocks, and for a much longer period than the two years spoken of in the prospectus of the Company as a probable limit of their efficiency. It would be quite a practical arrangement for a clock-maker, possessed of a good regulator, to electrically correct a number of self-winding clocks in a town or district. The battery required by each clock for self-winding purposes is, as we have seen, a single Leclanché cell. Over and above this, the clockmaker would require a battery in his place of business sufficiently strong to energize periodically as many delicate relays as he had clocks to correct. This battery, with an ordinary line resistance, would not require to be large: one wire would serve for all the clocks of the subscribers.

The Present Condition of the English Watch Trade.

By David Glasgow, *Vice-President of the British Horological Institute.*

THE present condition of the watch trade in England is somewhat analogous to the political situation—speculations as to its future are most unreliable and anything but reassuring.

The leading journal has lately published an article on the depression in our trade, in which we are told that the present is not a crisis, but that the trade has passed away from us never to return. But those who know the source of the inspiration of this article will not be so much alarmed at its conclusions.

Mr. Watherston, who is a prominent figure in all that relates to the goldsmiths' and watchmakers' trades, lays all the blame of our misfortunes at the door of the Goldsmiths' Company, and to the "horrid" Hall Mark, which he wishes to do away with. There are also many others who have their own theories of the causes of our loss of trade and, of course, they are all able to supply their own remedies, the principal part of the latter being the employment of more machinery and the factory system. These opinions are all natural enough at a time when trade and commerce is in a very depressed condition, not only in England, but all over the world, but the remedies suggested, from their contrariety and incompleteness, do not meet the case; and when people are under the necessity of curtailing their expenses in order to pay their way, they are not likely to indulge in the expensive luxury of a good English watch. Much emphasis has been given to the complaint by public men outside the watch trade, and especially by some who wish to be considered scientists, that the English watchmakers have not kept pace with foreigners, or, rather, that they have not outstripped them in the manufacture of watches by automatic machinery. This reproach, however, is not reasonable, nor is it even logical, as the boast of the advocates of automatic machinery is, that no skilled labour is necessary with the system; that the great excellence and superiority of it lies in the fact that the machine cannot err, the pieces produced by it being uniform and exact: watchmakers, therefore, who are highly skilled workmen should not be reproached because they do not combine their capital in order to reduce their social position, and capitalists here, on whom the blame (if any) should rest, seem in no hurry to invest their money in a gigantic watch factory, with so little certainty of a remunerative return.

In a very interesting lecture delivered last month at the Society of Arts, by Dr. Waldo, of Yale College Observatory, New Haven, U.S.A., on "The Mechanical Art of American Watchmaking," a great deal of information was given respecting the American watch factories, especially that of the Waltham Company, and no doubt the least unfavourable view of them was given. After describing the founding of the Waltham Company by Mr. Dennison, and stating that Mr. Ingold (who was generally credited here with being the father of American watchmaking) had nothing to do with it, the lecturer said: "The first company formed in the United States was not, financially speaking, a success, neither was the second. There had not then been found the financial ability for the head of such a company, and it was not found until May of 1867, when Mr. Royal E. Robbins bought the factory for 56,000 dollars—on which Mr. Dennison, his friends and successors had expended some 250,000 dollars."

But even with the financial ability found:—". . . . the company of which I speak barely lived until the Civil War broke out." When, "immediately there was a great demand for watches, strong, serviceable, uniform in quality; there was an opportunity to make a simple type." But even the Americans cannot afford an occasional civil war for the benefit of the watch factories; and, as the output of the factories must not only be of "simple type," "uniform, &c.," but also continuous if the factory is to pay, the Americans are under the necessity of finding markets other than their own for the sale of their watches, and that they are doing so with their usual business capacity and enterprise requires no further illustration than the presence of Dr. Waldo in England lecturing on machine-made watches. Although little is said of this uniformity at present, but what is said in its praise, the uniformity of size and shape of these watches will in the near future be one of the things that will tell against their sale. The English people hate uniformity, and their tastes cannot be squeezed into one mould like those of factory operatives, who are described as "machines." In England, individual taste has always been, and will always be, indulged in by those who can afford to pay for it, in everything pertaining to personal or domestic ornaments. This fact is exemplified in many ways. What, for instance, is the charm and success of the "Doulton" ware? Not so much the beauty of the art decoration as the variety—the absence of uniformity. Nor is the finest proof engraving or even the greatest work of art esteemed so much as a second rate watercolour drawing, unless the engraving is a scarce copy.

The goldsmiths' art has so long been associated with watchmaking, that "watchmaker" and "jeweller" have become almost synonymous terms; but of late science has been killing her sister art, and science and fashion together have banished all decoration for watch cases and dials. But fashions change, and the art that has given to the Swiss almost the monopoly of the world's markets for ladies' watches should not be overlooked or forgotten. Swiss ladies' watches, such as those shown by several of the foreign manufacturers in last year's Inventions Exhibition, will always find admirers and purchasers, and what we should carefully guard against is the want of the capacity to produce such work. Many of our best workmen have found remunerative employment in the United States within the last few years, who could not do so here, and a gentleman, who has made periodical visits to America, informs me that on a recent visit he found a marked improvement in both the style and the decoration of watch cases there, and this improvement is visible in the advertisements of the American trade journals. It must not be inferred from what I have quoted from Dr. Waldo's lecture that I have a prejudice against the use of machinery in watchmaking; as, considering that the use of labour-saving machinery is almost coeval with the art itself, such a prejudice would be very foolish.

The conditions essential to the success of a watch factory on a large scale, pointed out very clearly by Dr. Waldo, are, I think, worthy of the careful consideration of anyone who contemplates the establishment of such a factory here; but the advocates of automatic machinery have generally proved too much. They have asserted repeatedly that by the use of these machines unskilled labourers could produce watches, not only cheaper, but of a superior quality, to those made by the most skilled workmen on the old principle of machine-labour and hand-labour combined. The consequence of these assertions and beliefs has been that the factories established in England have not been so successful as could have been wished. They began at the wrong end, and instead of making watches to compete with the lower grades of Swiss and American goods, they produced watches to compete with the best, for which there was not a sufficient demand, and they have only succeeded in reducing the quality, and, consequently, the price, of the best watches made on the old system. I believe, however, that several of the factories are now preparing to produce a lower-priced watch that will compete with those of foreign make, and there is no reason why this should not have been done before.

The Swiss, although they are suffering perhaps more than ourselves from the stagnation in trade, have been steadily pursuing an upward course, and while we have been devoting ourselves principally to the production of cheap watches, without accomplishing much in that way, they have been using the knowledge acquired in their technical schools, and making high-class and high-priced watches, such as for a long time we believed could only be made in England. Thus, while we have been irresolute in making up our minds what to do, we have allowed our trade to be encroached on at both ends. Nothing could illustrate more forcibly the feebleness of English watchmaking than the manner in which the recent attempt of some of us was made to get rid of the injustice and anomaly of the law which compels the Goldsmiths' Company to assay and mark foreign-made watch cases which the officers of that Company know with certainty to be of foreign make, and which watchmakers and many other people know are intended to have Swiss movements placed in them with English dealers' names on, in order that they may be sold as English-made watches, thereby defrauding the purchasers and injuring the English watchmaker both in pocket and reputation. Although there were meetings of the trade held on the subject in Liverpool, Prescot, Coventry and London, and the assistance of the Goldsmiths' Company and of several Members of Parliament was at the service of the watchmakers, no half-dozen of them could be got to agree as to the simple and obvious course to be adopted. Such a want of union and of purpose is not likely to be assisted by any extraneous aid.

The City and Guilds of London Institute is to be congratulated on the successful and great work it is doing in resuscitating the manufactures of this country, and amongst these manufactures none required this assistance more than the watch and clockmaking industry; but the Clockmakers' Company (the Guild to which the trade has a right to look for co-operation and assistance) seems to have peculiar views of its duty. More than a year ago some of the more enterprising members of the Court of this Company obtained a Commission to inquire into the present depression, and to ascertain in what way they could assist and identify themselves with the trade. This Committee visited the Technical Schools, the one watch factory of London; and the Inventions Exhibition; and consulted various members of the trade; but they seem to be unable to decide between the claims of technical education and a factory for the manufacture of watches by machinery—the latter, one would think, rather out of the way of a City Company—and, as there are some watchmakers connected with the Company, one need not be surprised if up to the present they have given no sign of having arrived at a decision in the matter.

As I have described all these evils and adverse influences with which English watchmaking is at present surrounded, and, as I profess not to have lost all heart or hope for the future, I may be asked what remedies I have to propose. I think the remedies, like the diseases, are numerous; but no remedy is at all possible while watchmakers remain indifferent, or, what is worse, hostile to each other. Trade jealousy has not been confined to watchmakers, but in no other trade has it worked greater evil. Until very lately we have had no schools for teaching watchmaking, and, but for the City and Guilds' Institute, we would not have any now. While English watchmakers have been wasting their energies, competing with each other, the Swiss have been filling every shopkeeper's window with their wares; great and well-organised companies are proclaiming the superiority of their watches; and our own highly pensioned civil and military servants have also taken the field against us, although, I believe with but indifferent success—but they have managed to still further degrade the watchmaker by rules better suited to a convict establishment than a workshop.

I would, therefore, ask all those who feel any interest or pride in our still beautiful art to form some sort of union or centre of action, in order to get rid of some of the anomalies that hamper our trade, to promote improvements in the manufacture of watches and clocks, and to bring before the public the fact that we are neither dead nor dying. If such a body can be formed, I believe they will come to the conclusion I have long since arrived at, viz., that a good sound practical and scientific education for our youths is the thing most wanted.

Dr. Waldo, who is a very frank and courteous gentleman, on his first visit to the Horological Institute, said to me in one of the first sentences he spoke:—"This is the sort of thing we want in America." And, more recently, Mr. A. L. Dennison, already alluded to as the founder of the Waltham Factory, after carefully examining the work of the pupils in the practical classes of the Institute, and expressing his great satisfaction with the system on which they are conducted, and with the results shown him, added:—"This is the proper course to pursue, as, whatever may be the system of watchmaking in the future, scientific knowledge and manipulative skill will always be essential to its success."

There is one more point I would like to draw the manufacturers' attention to. I do not think the Clerkenwell workman is as badly off as the *Times* makes out, but I know many of the very best workmen who are but partially employed, and, if manufacturers, especially of the best watches, would speculate a little on the making up of stock, it might turn out a good investment, and would be a boon to many that are looking out for other sources of employment. The watch trade has been as bad before as it is now, but if the workmen are allowed to disperse, a revival of trade would not be a revival of prosperity, as we could not get the work done.

To the stay-at-home notions, the want of energy and enterprise, and the absence of all unity of thought and action among English watchmakers, I attribute, not the present depression of trade, but the intrusion into this country of the mass of rubbish the excellence of which is proclaimed from the house-tops.

The Royal Observatory Report.

In the Report of the Astronomer Royal to the Board of Visitors, reference is made to the fact that the rate of the Sidereal standard clock was much affected by exposure to cold in the course of the work on the ventilation and drain pipes in the magnet basement. The clock has, however, gone well since the completion of these alterations, and it has therefore been judged best not to clean it just now. The Chronograph has been thrice cleaned since the date of last report. A clock, synchronized by hourly currents, on Lund's system, has been presented to the Observatory by the "Standard Time and Telephone Company," and is fixed in the Astronomer Royal's Office.

The number of chronometers now being tested at the Observatory is 115, and of these, 81 belong to the Navy, the remaining 34 being placed here for the annual competition. This number was originally 37, but three of these, which had taken a high place in last year's trials, were purchased by the Admiralty in February, and consequently withdrawn from the trial.

The first six chronometers in the competitive trials were slightly below the average of the last ten years, as inferred from the trial numbers.

Mr. Kulberg's apparatus for automatically regulating the temperature of the chronometer oven has been in use since last November, and is perfectly successful.

The trials of chronometers will in future commence on the first Saturday of July, to end in the latter part of January. The rating is to be for 29 weeks, viz.: three periods of seven weeks each in the room, and two periods of four weeks each in the oven.

It is proposed to have an annual trial of deck watches for purchase by the Admiralty. The first trial to commence on November 27th this year, and end on January 22nd, 1887; the deck watches to be tried for two periods of two weeks each in the room, at a mean temperature of 50° to 55°, and for one period of four weeks, in different positions in the oven, at a temperature of about 85°.

The automatic drop of the Greenwich time ball failed on two days during the past twelve months. The Deal time ball failed seven times, owing to interruption of the telegraphic communication; and on three days the ball could not be raised, owing to the violence of the wind. There have been three cases of failure of the 1 p.m. signal to the Post Office. Nothing more has been done as regards the establishment of hourly time signals at the Lizard or Start.

One of the Transit of Venus clocks has been adapted by Messrs. E. Dent & Co. to give hourly time signals, and to be synchronized by the help of an auxiliary second's pendulum, on the plan proposed by the Astronomer Royal in the last Report.

The contact apparatus of the Westminster clock having been out of order, no signals have been received during the past twelve months. New contact pieces of improved construction are now being fitted. The Report is signed by Mr. Christie, Astronomer Royal, and dated the 5th of June, 1886.

Electric Clocks.

By J. Stephen.

It is proposed in these papers to speak of Electric Clocks as they divide themselves into classes. Lord Grimthorpe mentions three classes. The first is a mere clock movement, *i.e.*, the works of a clock, without either weight or pendulum, which is kept going by electrical connection with some other clock of any kind. These ought to be called electrical dials, not clocks. The second is a clock with a weight, but with the escapement worked by electrical connection with another clock instead of by a pendulum. The third alone are truly electrical clocks, the motive power being electricity instead of gravity; for although they have a pendulum, which of course swings by the action of gravity, yet the requisite impulse for maintaining its vibrations against friction and resistance of the air is supplied by a galvanic battery instead of by the winding up of a weight.

We shall probably find, as we get on, that Lord Grimthorpe's three classes will not hold all the varieties of clocks we shall have to consider. It will be better, however, to form and define new classes as we get along, than to be too precise and tedious at the outset.

It might be interesting to go into the question as to who was the first inventor of the electric clock. Probably we should find that there was no first inventor. The two men who have rival claims for priority are Alexander Bain, a Scotch watchmaker, and Mr., afterwards Sir Charles, Wheatstone, partner in a musical instrument shop, in London. We are inclined to think that, of the two, Bain was first; but this is a small matter, and, fortunately, the fame of neither is dependent upon this priority being assigned to him.

Bain, in one of his pamphlets on the subject of electric clocks, says:—"It was in the year 1837 that it occurred to me (while viewing the beautiful electro-magnetic apparatus in motion at the Adelaide Gallery) that the same power might be used to advantage in working clocks. Very shortly after the idea was conceived I began reducing it to practice. The first and most obvious plan was to make a common clock transmit its time to other distant clocks, worked by what is termed electro-magnets. These indicators, or, as they have since been termed, companion, subsidiary or affiliated clocks, may be placed in the various rooms of a house, or even in all the houses of a town, the whole being connected by wire to one parent clock. By this arrangement all the clocks so connected would, it was presumed, keep exact time with the parent clock. The idea took, indeed, a much wider range, viz., that all the clocks could be so connected by wires as to receive the time from one governing clock; and, chimerical as the scheme might then appear, I believe its realisation is within the limits of reasonable probability."

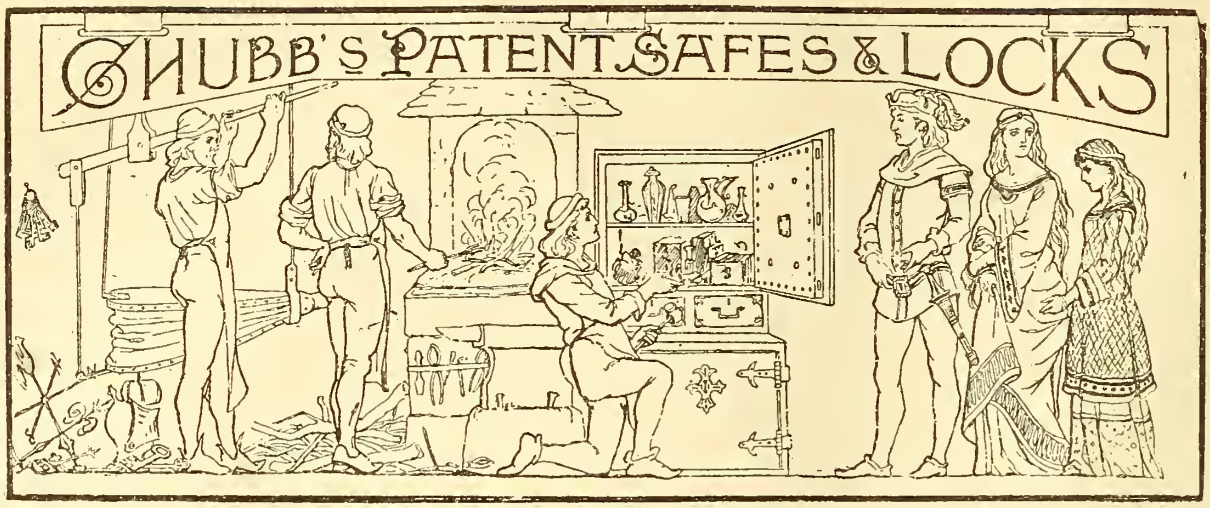
Mr. Bain goes on to describe the next step in the progress of the invention, which was the application of the electric power to work single clocks in such a manner that no winding was required. This, he considered, would be of great importance, as such clocks could be used either singly, or, when required, as the governing or parent clock. To get to this important result, it was necessary to get some reasonably steady and economical source of electricity for driving the clocks; and Mr. Bain, in 1842, while prosecuting some experiments relating to the telegraph, discovered that if the metals used in the galvanic troughs were buried in the earth, a power, which he himself describes as "very uniform and, practically speaking, everlasting," is obtained, and at a "mere nominal cost, though of small power compared with the galvanic trough in full action." The "small power" led Bain to devise "new arrangements of the magnetic power," and he succeeded in working clocks of any size, from the smallest mantel timepiece up to large church clocks, from the earth batteries.

There is a sort of pathos in the history of many inventions. We find a man of great talent making some new invention. There is, perhaps, one weak link in the chain, and yet one dare almost swear that this weak link is the one, of all others, the inventor thinks strongest. There is often just one such defective part in the chain, and one knows not whether more to applaud, or deplore, the ingenuity and patience that seek, by altering and modifying all the others, to retain that which is the real source of weakness.

The earth battery often failed to give even the small current necessary, and its failure brought discredit upon Bain's beautiful invention. It is curious to note, in the books, the unanimity with which poor Bain's plans are condemned. It is not believable that the writers of the text-books know, of their own knowledge, what they are talking about. At this day there are earth batteries driving clocks which have been doing so for many years. We believe that Sir Richard Webster, Q.C., has, in his house, a clock given to him by Bain, which has been driven by an earth battery for quite a number of years.

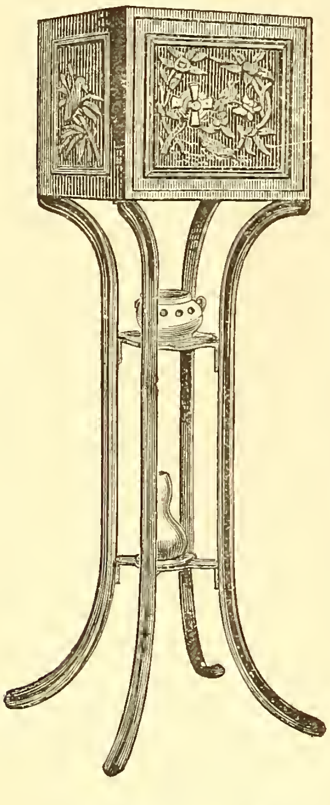
It is simply foolish to suppose that an earth battery will not answer, but there are no good enough reasons for using them in preference to others; and the earth batteries are more trouble than they are all worth. They will answer very well indeed in the hands of intelligent people, but they were of the greatest disservice to Bain, who liked them so much, that he always tried to fit his instruments to use them. They often, however, failed from the drying up of the ground in which the plates were buried. The whole arrangement began to be looked upon as unprofitable, and there soon arose others who, enlightened by Bain's experience, took away his profits, and much of the credit due to him for the invention.

Bain's arrangement will be understood from the figure copied from one of his own drawings. Z and C are the zinc and copper (or carbon) plates which are buried in damp earth. B is the hollow coil of wire forming the bob of the pendulum. N and N^1 are the north poles of two steel, permanent magnets. A and C are two metal standards fixed to the back of the clock. C is a wooden or ivory bar, fixed (but easily moveable) in the standards by means of binding screws. On the surface of the end of the ivory piece at F is inserted a piece of gold, concave on the upper surface, as seen at *f* fig. 2, which is in metallic connection with the standard *b*. At the end G of the bar is inserted (bound in a metal ring) a small piece of agate and a piece of gold, both semi-circular, represented by fig. 3; the light part being the gold, the dark part the agate, with a shallow groove cut in the surface of each similar to that in the gold at F in fig. 2. In the grooved part of the agate, and perfectly flush with the surface, is inserted a plug of gold, as seen in fig. 3. The plug of gold is in metallic connection with the bracket *a*. The semi-circular piece is to form the connection with other clocks at a distance: *f g*



Chubb's Jewel Safes

Chubb's Patent Boudoir Safe.



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MAKERS

By Special Appointment to Her Majesty the Queen.

Dated 20th February, 1847.

CHUBB'S BOUDOIR SAFE

Has been specially designed for Ladies who require a small and inexpensive receptacle for Jewellery in frequent use. This safe is strongly made of Wrought Iron, the door being secured by Chubb's Patent Lock, with Small and Neat Keys. It is handsomely painted, and decorated with Japanese panels; or can be finished in any style to suit furniture. The total height is 4ft. 6in.; the size of the Safe is 12in. high, 14in. wide, and 14in. deep; the Stand is of Iron; and, though the Safe is too heavy to be easily moved, the feet can, if desired, be securely fastened to the floor.

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LOCK & SAFE COMPANY, LIMITED,

128, Queen Victoria Street, E.C.; 60, Cornhill, E.C.; and 68, St. James's Street, S.W., LONDON.

represents the thin-kneed bar, the ends of which rest and slide freely in the grooves or concave parts already described, seen more clearly in fig. 2. R is the regulating weight which brings the pendulum to time. The opening in the interior of the reel B is large enough to permit the pendulum to vibrate freely, without the liability of touching the tubes N N. The suspension spring *j* being connected by a wire with the carbon, if the end of the kneed bar rests on the gold plug in the agate, the electric circuit will be complete; and the course of the current may be thus described:—The current is supposed to begin at the plate of zinc in the ground, thence through the moisture of the earth (a sufficient conductor) to the carbon, then through the wire D^1, as shown by the arrows, to the spring *j*, through the spring, through the wire 2 to the coil of insulated wire in the bob B, which it permeates, and from thence, by the wire 1, to the spring *i*, to the bracket of the break, through the gold plug in the agate, to point *g* of bar *g f*, then through bar to bracket *b*, and returning by the wire D to zinc plate, as shown by arrows.

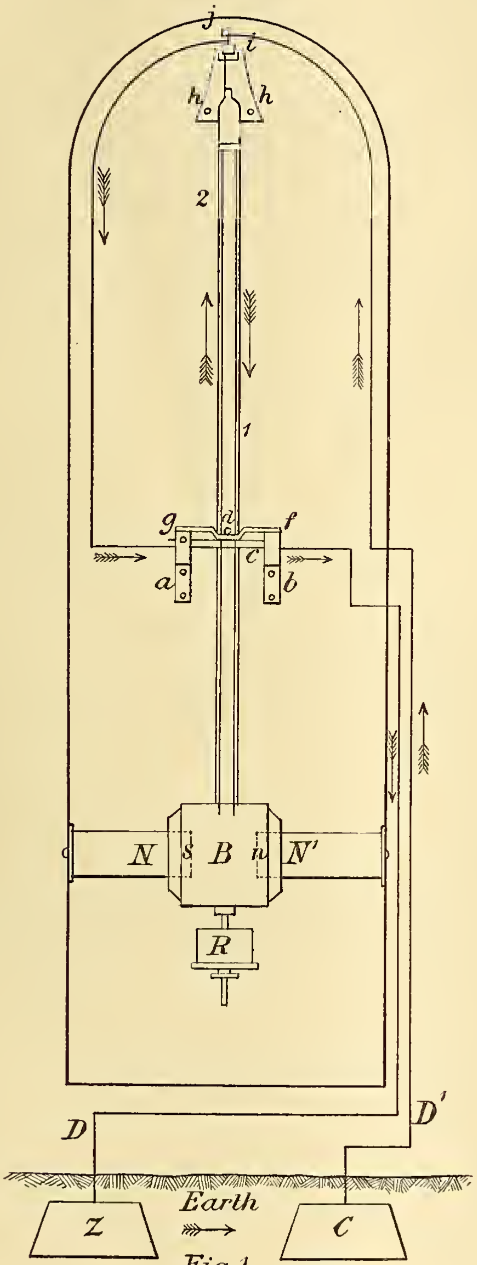

Fig. 1.

Fig. 2

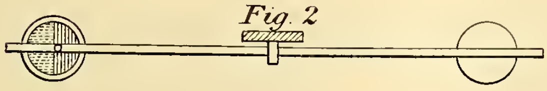

Fig. 3.

The mechanism, and the means of establishing the galvanic power, being thus explained, the manner of its operation remains to be shown. While the electricity is thus passing, it renders the coil in the bob B magnetic; that is, it has all the properties of a magnet with dissimilar poles, north and south. In the diagram, the north pole is to the right-hand and the south to the left. Now, the permanent magnets having their north poles inward next the coil, it is evident, by the well-known law of magnetism, that the north pole of the left-hand magnet will attract the south pole of the coil, while, at the same instant, the north pole of the right-hand magnet will repel the north pole of the coil, and, by these means, the pendulum will receive an impetus towards the left. It cannot, under these circumstances, hang perpendicular; but if the galvanic current is broken (which can be done by sliding the bar *g f* a little to the left till the point is off the gold plug), the coil being no longer magnetic, the magnet will have no further effect upon it: the pendulum is, therefore, free to go back in the contrary direction. The pendulum itself gives motion to the sliding-bar by means of the pin *d*, which projects from the rod and acts in the kneed part of the bar. If we now take hold of the pendulum with the hand and move it to the right till the point of the bar is on the gold plug, and then let it swing back, it receives an impulse from the magnets, as just explained. When it arrives at the end of its excursion to the left, it will push the sliding-bar off the gold plug; the power will then cease and it is free to return to the right hand by its own momentum, until it pushes the sliding-bar again on to the gold plug, and thereby receiving another impulse, will continue its vibrations, which will increase in length till the point of the sliding-bar is carried beyond the surface of the plug on the right, and partly on to the agate, this action cutting off a great portion of the electric current; and if the vibration further increases in the smallest degree, the power during one vibration is entirely cut off. In this way, says Mr. Bain, the pendulum is kept precisely at one given arc of vibration, however variable the current may be, provided only that there be always sufficient. The lower the break is placed with reference to the pendulum, the greater, he considered, would be the accuracy of its vibration. This governing principle of the break Bain considered to be a most important feature in the invention, as it was accomplished without any extra work or friction.

(To be continued.)

Report of the Deputy-Master of the Mint.

THE Sixteenth Annual Report of the Deputy-Master of the Mint, just published, states that, although the work of the past year has not been remarkable for any incident of special importance, the Department has been occupied without intermission in meeting the home demand for gold, silver and bronze coin, and in executing the coinages required for the Colonies, which were more numerous and of greater amount than in any previous year.

The amount of gold coined during the year 1885 was again below the average, though exceeding by more than half-a-million the amount coined in 1884; and the silver coinage, which was larger than that of the previous year, was slightly in excess of the average. The amount of bronze coined was somewhat less than that of 1884, although considerably in excess of the yearly average of the last ten years.

STAUFFER, SON & CO.,

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Watch Manufacturers,

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CHAUX-DE-FONDS.

WATCHES OF EVERY DESCRIPTION, BOTH FOR HOME AND COLONIAL MARKETS.

Fine and Complicated Watches.

SPECIALTIES IN

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Made by Machinery on the GAUGED AND INTERCHANGEABLE PRINCIPLE.

EVERY PART OF MOVEMENT SUPPLIED FINISHED. GENTS' AND LADIES' SIZES.

"ATLAS" CHRONOGRAPHS, RAILWAY "ATLAS,"
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KEYLESS AND NON-KEYLESS, FULL PLATE AND THREE-QUARTER PLATE.

TRADE MARK (REG.), THE "ATLAS" WATCH.

PRICE LIST ON RECEIPT OF BUSINESS CARD.

Telegraphic Address—"STAUFFERS, LONDON."

Watches with Class "A" Kew Certificates in stock, or with Customer's own name on the Certificate at a few hours' notice.

The coins struck during the year 1885 were of thirty-eight different denominations, namely:—

BRITISH COINAGE.
Gold—Sovereigns.
Half-sovereigns.
Silver—Half-crowns.
Florins.
Shillings.
Sixpences.
Fourpences (Maundy money only).
Threepences.
Twopences (Maundy money only).
Pence ditto.
Bronze—Pence.
Half-pence.
Farthings.

NEWFOUNDLAND.
Gold—Double Dollars.
Silver—Fifty cents.
Twenty cents.
Ten cents.
Five cents.
Bronze—Cents.

HONG KONG.
Silver—Twenty cents.
Ten cents.
Five cents.

STRAITS SETTLEMENTS.
Silver—Twenty cents.
Ten cents.
Five cents.
Bronze—Cents.
Quarter-cents.

CANADA.
Silver—Twenty-five cents.
Ten cents.
Five cents.

CYPRUS.
Bronze—Piastres.
Half-piastres.
Quarter-piastres.

BRITISH HONDURAS.
Bronze—Cents.

MALTA.
Bronze—One-third farthings.

JAMAICA.
Nickel—Pence.
Half-pence.
Farthings.

The total number of good pieces struck was 63,493,476, showing an excess of 7,130,175 pieces over the number struck in 1884, and their value, real or nominal, was £3,890,153 4s. 11d. The total number of good pieces of the Imperial coinage struck was 42,963,476, and their total value £3,733,090 8s. 5d. The amount of gold coined in the year was £2,952,158, as against £2,336,513 in 1884. The Bank of England were the only importers of bullion for coinage, and the value of the gold sent in during the year, which consisted almost entirely of light gold coin withdrawn from circulation, was £1,249,918. The Australian gold coin received by the Bank of England in 1885 consisted entirely of sovereigns, and amounted to £3,012,000. This amount is above the average received during each year from 1875 to 1883 inclusive, and exceeds by more than £2,727,000 the amount received in 1884, when the importations of gold coin from Australia fell to the abnormally low amount of £284,040. The silver coin struck during the year amounted to £727,570, and the amount issued to £624,523, the difference consisting of the usual amount of Royal "Maundy" moneys annually issued.

It seems that the demand for threepences has increased, owing to the large withdrawal from circulation of fourpences, and attention is called to the greatly increased demand by the Colonies for the former coin, though what lesson in economics this would point out it is rather difficult to say.

The half-crowns issued were of the nominal value of £164,700, as against £186,700 in 1884; and the total amount of these coins added to the circulation since 1874, when their coinage was resumed, has been thus raised to £2,112,790.

Tables are given showing the amounts of silver coin issued to, and withdrawn from circulation in, England, Scotland and Ireland during the last fifteen years and fourteen years respectively, and also of the amounts issued to, and withdrawn from, the Colonies in 1885; an interesting portion of the latter part of the report relating to the demonetising of the Sicilian dollar—which was the principal coin of the Island of Malta—by the Italian Government.

The average market price at which silver bullion was purchased by the Mint for coinage during the year was $48\frac{9}{16}$d. per ounce, as against $50\frac{1}{2}$d. in 1884, and, as the rate at which silver coin is issued by the Mint is 66d. per ounce, the seignorage which accrued to the State in 1885 was at the rate of $17\frac{1}{2}$d. per ounce, or nearly 36 per cent., which is the highest rate of seignorage yet attained, and shows the very low price of silver bullion which ruled during the year.

The nominal value of the subsidiary silver coins struck at the Mint, and by Messrs. Ralph Heaton & Sons, of Birmingham, for the Government of Hong Kong, during the last five years, has been no less than 1,090,000 dollars, an amount which at once seems to be in excess of the requirements of a Colony with so small a population; but it appears that these coins are in great demand for circulation in China, and are exported in large quantities, almost as soon as they reach Hong Kong, for use in the interior of that country.

The only coins struck during the year for the Government of Guernsey consisted of the following bronze pieces:—Eight doubles, Four doubles, Two doubles, and One double, which were executed by Messrs. Ralph Heaton & Sons, of Birmingham, the metallic currency of the island consisting chiefly of French coins. The pieces of eight, four and two doubles correspond approximately to the penny, halfpenny and farthing, and the double to a half-farthing.

The operations of the Mint have again been financially successful, the excess of receipts over expenses having amounted to £73,958. A large number of coins selected from the treasure trove sent for examination, and mostly specimens of unusual interest, were added to the Mint Collection during the year.

In addition to the medals awarded to the troops engaged in suppressing the rising in the North-west of Canada, the medals of the Royal Horticultural Society, and the Gold, Silver and Bronze medals of the International Inventions Exhibition, were struck at the Mint during the year—the latter medal being designed by Mr. Lewis F. Day. It may be interesting to note that the reverse of the "Pass" used by members of the Executive Council was a reproduction of an original device by William Hogarth.

Professor Roberts-Austen has continued the experiments on the wear of coin. After referring to the waste, the report goes on to state that the result of the annual trial of the Pyx was in every respect satisfactory, the sample gold coins showing an average fineness of 916·65, while the fineness of ingot produced by melting a large number of coins was found to be 916·6, or exactly standard. The average fineness of the silver coins assayed was found to be 925·2, or slightly above standard.

The prosecutions during the year for offences against the Coinage Law were 248.

The total imports and exports of silver in bars and coin in 1885 were £9,300,000 and £9,600,000 respectively.

Since the beginning of 1886 the price of bar silver in London has been as follows:—

	Average Price.
January	$46\frac{3}{4}$d.
February	$46\frac{11}{16}$d.
March	$46\frac{3}{4}$d.
April	$46\frac{3}{8}$d.

The average price for the four months, therefore, was $46\frac{5}{8}$d., or exactly 2d. less than for the year 1885.

The rate of issue for the Mexican dollar in the East, and for the rupee in Ceylon and Mauritius, in making payments on account of the Imperial service during the year 1886-87, was fixed by their Lords of the Treasury early in January, at 3s. 7d. and 1s. 7d. respectively, as against 3s. 8d. and 1s. $7\frac{1}{2}$d. in 1885-86. The annual revision of these valuations is based upon information furnished by this Department of the average price of standard silver in the market during the preceding twelve months, and the corresponding metallic value of the coins.

The report contains an account of the market movements of gold, by Messrs. Mocatta & Goldsmid, and, with the exception of an interesting paper on the art of modelling and casting medals, by the Deputy-Master, who is President of the Society of Medallists, is further made up of appendixes containing the reports of Deputy-Masters of the Colonial and foreign Mints, and statistics.

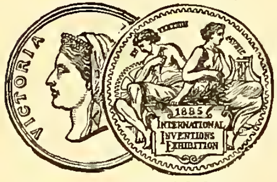
INTERNATIONAL INVENTIONS EXHIBITION.

The ONLY PRIZE MEDAL for Dust-proof Cases and Improved Movements.

SQUIRE'S PATENT

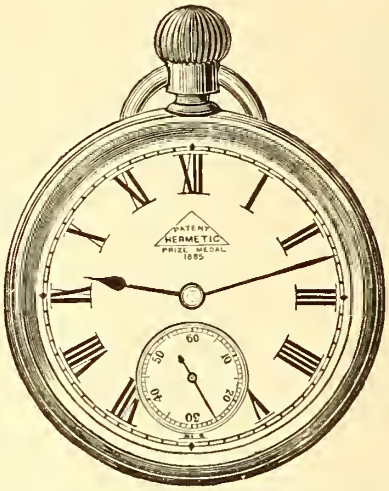
New Dust-proof Keyless and Key Watches, in Silver and Gold Cases.

The ONLY AWARD,

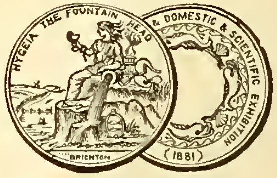


LONDON, 1885.

These are the most important improvements in Watch Movements and Cases in modern times. The best features of English watches are retained, while the faults of both full-plate and three-quarter-plate are got rid of. The improved removable barrel, going two days and giving uniform force, like the fusee, for 24 hours—the protected balance pivots and holes—the set hands at back in key watches—the new hairspring stud, for perfect adjustment of the spring—the elegant appearance and dust-proof case—make them the best watches in the trade for gentlemen or workmen.



HIGHEST AWARD,



BRIGHTON 1881.

A most valuable feature in the Gold Watches, is the adjustment, even in the lowest price watches, of all balances and springs to temperatures and positions by which fine results are obtained at a low price. **In this particular Squire's Patent Watches stand alone.**

These Watches are being made a leading article in most districts of England—monopoly being given to one watchmaker for each district—and they are found to be the most successful opponent of the

LUDGATE WATCH.

PARTICULARS AND SPECIMEN LITERATURE ON APPLICATION.

R. SQUIRE,

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J. * TRIPPLIN,

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SPECIALTY:—CHRONOGRAPHS OF THE FINEST ENGLISH FINISH, ADJUSTED FOR POSITION AND TEMPERATURE.

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WATCHES OF EVERY DESCRIPTION, BOTH FOR HOME & COLONIAL MARKETS.

FINE AND COMPLICATED WATCHES.

English Keyless Lever Watches of London Manufacture.

PRICE LIST ON RECEIPT OF TRADE CARD. *Telegraphic Address: "TRIPPLIN, LONDON."*

Watch Polishing.

By Henry Bickley.

POLISHING, though looked on as a subordinate part of the watchmaker's art, is one requiring as much tact and skill for its complete mastery as many more important parts of the trade. It may be said of it with truth, that the boy is father to the man, for he who would excel must begin early and practise much.

It is from this want of practice, among other causes to be noticed presently, that watch-jobbers are seldom able to polish, even passably well. Called on, it may be only at rare intervals, to fit a new piece, they find that, although perhaps able to bring it to the required shape and fit, they yet lack the ability to give it the finishing touches in which the good workman prides himself. The man engaged on new work, on the other hand, attains his proficiency by constant and unremitting practice from the first, and by doing similar pieces of work over and over again. It is only by this means that the requisite "knack" and delicacy of touch can be acquired. In fact the "new" man *learns* to polish and the jobber does not. Bearing this in mind, I cannot hope to teach my readers—of whom I expect jobbers form a considerable number—to polish by merely talking about it; but I can help them to learn for themselves if they have the will and the patience, by explaining certain broad principles which must always be adhered to if good results are to follow, and by pointing out what I conceive to be some of the more frequent causes of failure.

The first principle to be observed is that the polisher must be softer than the thing polished. This is a principle that admits of no variation. Hard steel, for instance, may be brought to a tolerable surface with soft iron, but with steel of less temper, bell-metal, zinc or tin must be used as may be necessary, according to the temper of the piece under treatment. It will be found as a rule that large surfaces require softer polishers than small ones. This may be accounted for by the hard polisher cutting the large surface too fast and so charging the polishing stuff with the worn metal. This fact is most observable in large pieces polished underhand. The indications of a polisher too hard are a dull, seamy, milky-looking surface. If covered with sharp scratches the fault is more likely to be in the polishing stuff than in the polisher.

A polisher too soft will produce a surface apparently covered with minute flaws, known in the trade as "specky." The foregoing remarks are meant to apply to steel pieces, and the same general principles hold good in the case of brass, though it may be remarked in passing that to polish brass well is far and away the more difficult operation of the two. The substances used for brass are soft tin, whalebone, horn and hard wood. All good, especially the two former.

The point next in importance to the composition of the polisher is its shape; indeed, I am not sure that it is not more important, for the true test of good polishing is the shape of the work. If a surface intended to be flat—or square, to speak in the technical sense—is rounding or hollow, it is a proof of bad workmanship, however much it may shine or glitter. Such work, for the most part, must be the reflex of badly-shaped polishers, and hence the necessity for keeping them in good condition. A straight-edge should be frequently applied to them, and any irregularity of surface or shape carefully corrected. As the polisher is so must the work be, they can only be counterparts of each other, and the workman who cannot or does not file his polishers into a proper shape will never succeed in making good work. Polishers too, especially the smaller ones, should be frequently renewed, for when they become thin and springy they are quite unreliable, and the sooner they are rejected for new ones the better. Soft metal polishers, used chiefly for polishing train wheels, should be re-cast as soon as they cease to be shapeable. If a model be formed of a piece of wood filed to the exact shape, and a plaster mould made from it, the polisher may be cast so smooth as to be almost fit for use.

Having said this much of the polishers, we will now turn to the work to be polished, and of this it may be said that the less it is polished the better. Everything, from the smallest pivot to the largest steel piece, should be brought to the exact shape before being polished. Neglect of this condition is a frequent cause of failure. The shape of a thing should not be altered in the process of polishing. To take pivots, as a case in point: a pivot should have the proper shape given to it by the graver, and be so near the right size that mere smoothing is all that is wanted. It is one of the commonest complaints from those not master of it, that they cannot polish a pivot without getting "a lump in the corner" of the shoulder. Now, supposing the complainer to know something of what he is doing, his difficulty must arise from one of the causes under notice. His polisher is in a bad shape, or the pivot was badly turned, perhaps tapering forwards, and in that case even an expert would find it no easy matter to bring it straight without bringing the lump at the same time. To polish as little as possible, and to determine the shape in the first instance, are maxims that should ever be present to the mind of the learner, not as regards pivots only, but with regard to everything with which he may have to deal. For reasons just stated, I am not much of an advocate for the use of oilstone dust as a polishing medium. It is useful for brass in positions where the bluestone cannot be conveniently used, such as hollows, &c., and for large steel pieces it may also be employed, but for anything small I consider it to be quite out of place. It cuts so fast, and so soon alters the shape of the polisher, that in the hands of the inexperienced it is certain to do more harm than good. The coarser form of redstuff, known as clinker, will be found quite sharp enough, and it has the advantage over oilstone dust of giving a much smoother surface, so that it can be followed by the finishing stuff without any intermediate treatment.

I will now pass on to say a few words on polishing stuff in general, and of the proper mode of preparing it for use. When diamantine was first introduced into this country, more than twenty years ago, it came so rapidly into favour that it was thought by many that redstuff would pass out of use altogether. But, though diamantine has held its own, it has not made way as was anticipated. This, I think, is due to several causes. In the first place, diamantine seems so much dearer than redstuff, that many have, no doubt, been kept from buying it on that account. The difference in cost, however, is imaginary; or, if there be a difference, I think diamantine, considering what can be done with it and the time saved by its use, far the cheaper substance of the two. I speak of it as being used only for finishing, and not for squaring up work. But there is another cause that may have had a still greater effect on its use, viz., the great inferiority of the diamantine sold now to that first introduced by Mathey, or, if there is any as good to be got, I have not been fortunate enough to meet with it. Another drawback to diamantine is that it will not polish brass, though I have succeeded, with Mathey's, in polishing small pieces, such as jewel settings and balance spring collets. But though it fails generally with brass, its superior powers for polishing steel admits of no question whatever. It cuts quicker, gives a blacker, deeper surface, and will polish steel of a much lower temper than redstuff. But even the finest diamantine will prove unsatisfactory in its results if it is not properly prepared and used with discretion, as, I fear, it seldom is, except by the few. It should be mixed in small quantities, either on glass or a hard steel stake, with very fluid watch oil, such as Kelly's or Nye's. It must be thoroughly incorporated with the oil, and beaten into a thick paste, care being taken not to put too much oil, for as it is beaten the mixture becomes wetter, and if used at all wet it will not work well. Zinc makes the best polishers for diamantine, or tin may be used if the piece be softer than usual. The paste must be used with extreme care, the polisher being only just damped with it; if too much is used it will cut, as before explained.

Much the same remarks, with regard to mixing, apply to redstuff as to diamantine. I find a tendency on the part of everyone not accustomed to the use of redstuff to put too much oil to it, and so to make almost fluid what should really be a stiff paste. Of course, under such conditions, success is impossible; so much rubbing is needed to dry it off that smoothness even, much less colour, is out of the question. As in the case of diamantine, the best watch oil only should be used, and the polisher moderately covered. Steel generally does not polish well with redstuff on anything softer than bell-metal, but it may sometimes be used with zinc.

Last, but by no means least, there is a homely principle—I had almost said virtue—connected with polishing that must be strictly observed if success is to follow, and that is cleanliness. As Demosthenes said of action, that it was the soul of oratory, so in a minor sense may it be said of cleanliness, that it is the soul of polishing: without it success may be sighed for, but will not be won. The work, the block, or whatever the work may rest on or be attached to, the polisher, the polishing stuff, and in short everything connected, must be kept scrupulously clean. Plenty of soft bread must be used, and should the piece under treatment have holes or notches in it they must be kept clear by frequent pegging. When finishing off, the polisher should be moved in short circular strokes and the polisher filed after every rub with an old smooth cut file kept for the purpose.

I have now touched on most, if not all, of the leading points connected with the subject. My remarks have been general, as I had no intention of writing a treatise, but I hope they may be of service to some at least of those who may read them.

International Exhibition, Edinburgh, 1886.

THIS Exhibition is in a large measure retrospective in its character. This applies both to the fabric—into which there has been introduced an Old Edinburgh street—and to the exhibits. But by a strange irony of fate neither the oldest firms in the jewellery and watchmaking trades, nor the oldest exhibits, have found their place in the booths and alleys which recall the times of George Heriot and King James. On walking through the street we cannot fail to note a striking combination of the sixteenth and the nineteenth centuries. The buildings, and the attendants in their quaint costumes, enable us to realise the former; the exhibits bear the manifest stamp of the latter. The jewellery and plate are almost without exception of recent manufacture, and of modern patterns, and they look strangely out of keeping with the quaint old booths in which they are displayed. But the exhibit of James Ritchie & Son completes the contrast. In itself most excellent, and showing the most recent applications of electricity to horology, it destroys at once all hope of the visitor realising the aspect of Old Edinburgh in a bygone age. It seems also most anomalous that such a scientific exhibit should be flanked on the one side by a sweetstuff shop, and on the other by a toy stall.

Mr. Torrance has been much more fortunate in his site. He has erected a large sized model of a turret clock with four glass dials. It stands under the shadow of the market cross, and gives the time to "Old Edinburgh."

On turning to the Grand Hall, in which there is gathered quite a cluster of the Edinburgh jewellers and watchmakers, we notice the reverse. Amid surroundings of modern architecture, there is shown a most unique display of both silver, plate and watches, dating from the sixteenth century to the present year. One firm even exhibits the old sign which for many years did duty outside their booth, near St. Giles.

The collection of watches embraces specimens of all kinds, from the "Nuremberg Egg" watch to the modern automatic watches.

There are some notable curiosities in the stall of R. Bryson & Sons. Among them is a watch made by Paul Romein, a Frenchman, who worked in Edinburgh about 1670. The "Nuremberg Egg" watch is remarkable. It has neither chain nor balance spring, a piece of catgut supplying the place of the former. The dial shows the hours, days of the month and week, also the moon's age, and time of high water.

There is a blind man's watch, curious on account of the raised points round the edge denoting the hours. This watch is said to have been worn by the Duke of Wellington on the day of Waterloo; and we can easily imagine the anxiety with which he consulted it as he waited and wished for night or Blucher.

Marshall & Sons show a collection of old French watches, some of them dating back two hundred years. Their cases are, perhaps, more remarkable than their movements, as they are principally in the form of fruit or flowers, and most elaborately and delicately enamelled. One of them, in the form of a Marquise finger ring, is of diminutive dimensions, the dial measuring little more than a quarter of an inch in diameter. The others are in the form of peaches, tulips, apples, violins, guitars, &c. There is introduced among them an English keyless lever watch in the form of a ring, with the dial surrounded by brilliants.

Of modern watches, the best exhibit is by Lewis Donne, of London. The special feature of his watches lies in their possession of the new patent resting barrel movement. What attracts more attention, however, from the public is a "mysterious clock." On a square-shaped glass dial, set in a gilt frame, are fixed a pair of hands, showing the time: but there is no apparent means by which the hands are kept in motion. The dial is transparent, so that the works cannot be concealed there.

James Crichton & Co. and W. Marshall & Co. exhibit the new automatic watches with the straight line escapement. They are shown in pieces, and in all stages of their manufacture.

In the Artisans' Section there are a number of exhibits, manufactured principally by local workmen, and also, we are glad to note, by their apprentices. Two of them might be singled out for special mention. One is a skeleton timepiece by W. Smith, Musselburgh. The movement is supported upon a glass tube about six inches high, in which there works a spiral spring which does duty for a mainspring. It is by far the cleverest specimen of work in this section, and is ingeniously contrived. The other is a pencil case, by James T. Kay, Edinburgh, into the head of which there is introduced a watch with three dials, showing the hours, days of the week and days of the month. Although rather cumbersome for a pencil case, it is a good piece of workmanship.

As a general remark, it may be said that there is nothing new in the Exhibition, neither are the exhibits large or numerous. Yet they are comprehensive, and it cannot be said that the visitor is wearied by seeing too many of the same articles.

Its effects on local tradesmen are likely to be beneficial, and the efforts which some of the workmen have put forth to furnish exhibits for the Artisan Section will themselves bring their own reward.

Precious Stones.

The Great Diamond.—Before long we are likely to be favoured with a distinguished visitor, though, possibly, one too expensive for any of its numerous admirers to permanently entertain. To parody a phrase of the day, the Great White Diamond from South Africa will soon be on view. Some two years ago this glittering bauble arrived from Griqualand, and remained for a season the envy of the many magnates who, after admiring its four hundred and fifty-seven carats of rough weight, came to the conclusion that—like Plato on a celebrated occasion—it is quite possible to "buy repentance at too great a price." At last, however, a Syndicate of London and Paris jewellers ventured on buying it, and, in the hope that it would turn out for their joint benefit, despatched the precious crystal to be cut by one of those skilful craftsmen of whom Amsterdam seems to possess the monopoly. For eight months this artist has been engaged in this delicate task, and hopes to announce the completion of the slow and risky operation by the beginning of April. In weight, in colour, in purity, and in lustre, its owners claim that it will surpass all the Crown and historical brilliants in the world. Without adopting so lavish an estimate of its merits as that held by its not impartial proprietors, we may, nevertheless, fairly assume that the stone now on the polisher's wheel is a very remarkable bit of carbon. In its almost finished state it still weighs two hundred and thirty carats, or only fifty-eight less than the "Stewart" Diamond, from the same region, did in the rough. But in order to give it the best possible shape and lustre, it is intended to facet it still further, at an additional loss of thirty carats, so that, when it is offered for the approval of the millionaires, it will weigh exactly two hundred carats. This will be a good deal more than the "Regent" of France, and almost twice as much as the "Koh-i-noor," though considerably less than the "Mogul" or the "Nizam," which weighs, in its uncut state, three hundred and seventy-six carats, and is valued at seven hundred and twenty thousand pounds sterling. But when all has been said in praise of the Big Diamond from South Africa, the first question that arises is, Who will pay for it? No private individual could fairly afford to invest in a mere gem so much money as will be claimed for it, and unless the Shah of Persia still cherishes his historic taste for jewellery, it is more than likely that, with all its virtues, the two hundred carats of unsurpassed brilliancy may for a long time hang heavy on the owners' hands.

Meantime, there is the Diamond, and no doubt in a couple of months half the idle folks of the Metropolis will be breaking the Tenth Commandment as its rays beam on them through the jeweller's bars. However, even should some purchaser be found for the glorious jewel, it is a mistake to suppose that he will be able to indulge the satisfaction of feeling that he is the owner of the greatest diamond in the known world. There are several much larger, and if the "Braganza," which in 1741 was extracted from the mine of Caétha Merim, should prove to be a diamond, then it is certain that no other stone or collection of stones, can approach it. The Portuguese Government are very chary about permitting anyone to examine or to weigh it. But the best estimates put it at 1,680 carats, though at the same time, the general belief is, that the supposititious diamond is really a fine, white topaz—a rare and heavy stone, worth some forty or fifty pounds when the size of a pigeon's egg and well cut—which in Brazil and elsewhere often counterfeits the more costly gem. A Malay Noble, in Brunei, offered a "diamond" the size of a pullet's egg for the sum of one thousand pounds, and nearly succeeded in disposing of it, when the stone was discovered to be a pinkish topaz. The "Regent," which weighs $136\frac{3}{4}$ carats, is however, an indubitable diamond, and, if the Republic persists in selling the French Crown Jewels, may run hard with the less historic gems now being fitted for the fashionable world. It is one of the famous Golconda Diamonds, and forms the theme of Pope's libellous lines on the grandfather of the first Earl of Chatham, who came into possession of it when Governor of Fort St. George. Hence it is sometimes called the "Pitt" Diamond. The "Orloff," which is affirmed to have been stolen out of an Indian temple, where it formed the eye of an idol, is much larger, weighing within $5\frac{1}{4}$ carats of the South African one. What it is worth can only be guessed at. In 1772, the Empress Catherine bought it for £90,000, an annuity of four thousand roubles, and a Russian title of nobility. The "Grand Duke" weighs $139\frac{1}{2}$ carats, though some give its bulk at something less; and the "Koh-i-noor," in its present condition, does not exceed $102\frac{1}{2}$ carats. When this stone was first known it weighed 900 carats. It was, however, successively reduced to 280, and then to $186\frac{1}{4}$, which was its weight when exhibited at the Great Exhibition of 1851. But, when it was found to have been badly cut—the brilliancy which depends on the due proportions between the several parts of the stone not having been maintained—it was taken in hand by Heer Vorrsanger, a cunning diamond cutter of Amsterdam, the result of which operation was that it lost $83\frac{9}{16}$ carats, though even yet the economy practised in reducing this irregularly-shaped Indian-cut stone to symmetrical form, with the least loss of weight possible, has left it much too broad for its depth, and therefore far less brilliant than it would otherwise have become. Symmetrical cutting, according to the ascertained refractory power of the stone, though essential to the proper treatment of diamonds, is sad waste. The "Regent," in being reduced from 410 carats to $136\frac{3}{4}$, lost pieces valued at £4,000. The "Star of the South," when it came from Brazil in 1854, weighed $254\frac{1}{2}$ carats, but has since then been reduced to 124. The "Stone of the Great Mogul" is mainly known from the description of Tavernier, the French traveller of two centuries ago. Most probably it is that diamond known as the "Darya-i-noor," which weighs $279\frac{9}{16}$ carats, and graces the treasury of the Shah. The "Mattan," or "Landah" diamond, which weighs 376 carats, is another scarcely less mysterious crystal; while, compared with these, the "Sancy," of $53\frac{1}{2}$—valuable for its romantic history—the "Shah," of 86, the "Polar Star," of 40, the Nassac," of $78\frac{5}{8}$, the "Piggot," of $82\frac{1}{4}$, and the "Pasha of Egypt," of 40, are barely worthy of mention.

However, a diamond is not valuable solely on account of its size, its shape, its water, its flawlessness, or its brilliancy. The "Hope" Diamond, though weighing only $44\frac{1}{4}$ carats, is estimated to be worth £25,000, solely owing to its fine blue colour, coupled with remarkable brilliancy; while a red stone in the Russian Treasury is valued at £15,000, though its weight is less than ten carats. Yet there is probably no property more precarious or of less real value than a huge diamond. The possible buyers are few, and—if one could imagine anything so vulgar of such resplendent personages—they might form so close a borough as to be able, by organising a sort of glorified "knock-out," to buy at their own price. This would be seen were the French Crown Jewels brought to the hammer. A collection of moderately-sized stones, each within the compass of the people who are imbued with the ambition to wear a diamond ring or a diamond brooch, is far more likely to meet with a ready and a profitable sale. But after all, the recent discoveries of the chemist have rendered the purchase of precious stones almost a folly. A lady may feel in her heart of hearts all the exultation which the owner of a set of "real" diamonds can experience. Yet, though she carries in her breast an affidavit from Hatton Garden, the chances are that the world at large will set them down as only imitations. Of late years, "diamonds" have been produced which will defy almost every test except that of polarisation. They even resist the file, and they flash with all—and, indeed, something more than all—the brilliancy of the "Star of the South" or the "Koh-i-noor." In many cases so perfect are these imitations that jewellers are puzzled, and depend for their guidance on the opinion of the experts who cut and set their gems. Perhaps the mere fact that they are imitated rather too well, and, in many instances, flash with a generosity which the real article is incapable of, forms the first ground for suspicion as to their genuineness. That, nevertheless, though well enough for the jeweller, is no criterion in the ball-room. *There* it is impracticable to produce the file; and even the most suspicious of dames might hesitate before applying the polariscope to the tiara of her rival. The terror which seized the owners of gems when it was announced, six years ago, that a Glasgow chemist had succeeded in producing the diamond by artificial means has not been justified by the practical result of his experiments. Nor, indeed, is there any longer much necessity for crystallising carbon after the costly fashion of Mr. Hannay. The imitation article, which can now be bought for a few shillings, set in an imitation metal which stands all the tests for gold, is infinitely superior in appearance to anything ever likely to be turned out of the *savant's* laboratory.
—*The Standard.*

The Diamond Trade at Antwerp.—The diamond trade at Antwerp has of late been largely developed. The value of the diamonds cut there every year is estimated at £1,000,000. They are exclusively Cape stones.

The Output of the Kimberley Mines.—Sir Charles Mills writes, with reference to an article in the *Pall Mall Gazette* on the Diamond Mining Exhibition in the "Colonies":—"The value of the output from the Kimberley mines is put at two millions, as if that were the total from the beginning, while it is only the average annual output, the total from the beginning being officially known to be £35,000,000, and on very good grounds believed to reach £40,000,000."

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* * *

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The Diamond Market.—According to *De Diamant*, published on the 23rd ulto., the Amsterdam market remains very quiet; although the factories keep on working, there is little demand and no sales for cut goods. Rough, at easy prices, finds some buyers. The Paris trade remains limited to small parcels, at prices unfavourable to sellers. The steamer "Hawarden Castle" had arrived at Plymouth on the 21st, and the steamers "Spartan" and "Roslin Castle" were expected on the 23rd and 29th respectively, but, though the foreign buyers were numerous, the price for rough ruled too high in proportion to what cut goods would realise. The news from Kimberley, May 22nd, was not considered so satisfactory, but the local market continued firm, and all classes of goods were in steady demand.

The Ruby Mines of Burmah.—The *Rangoon Gazette* states that the Government of India is about to grant a concession to work the ruby mines in Upper Burmah to a powerful French company, with a sprinkling only of English wealthy names for official use; and states that, by means of this concession, France is likely again to obtain a fair standing in Upper Burmah, and to enjoy large territorial rights. The proposed concession will comprise all the privileges formerly enjoyed by the lessees from the Burmese Government, including the right to collect taxes in a district of more than fifty square miles in extent. The *Gazette* strongly protests against the proposed action of the Government of India, remarking that it will result in placing a large number of the Burmese in subjection to foreigners ignorant of the country and of the manners and customs of the people, and interested only in extracting as much profit as possible from them. The mines have from time immemorial been worked by the peasantry of the district, and the *Rangoon Gazette* states that it is only by depriving the Burmese peasantry of their rights that the company can pay the rent which it offers.

Gemming.—An enterprise (writes a correspondent of the *Pall Mall Gazette*) in which the general public seems entirely left out in the cold, is that of gemming. The most casual glance at the Ceylon Court of the Indian and Colonial Exhibition cannot fail to strike any one with the immense value of stones yet unfound even in this one productive island. A good deal of business also is carried on in this court, sapphires and rubies being bought and ordered by many ladies attracted by lower prices than are usually asked by jewellers. Why a company has never been formed for the purchase and working of gemming land in Ceylon and India strikes me as strange. If a few ounces of gold were to be found in any new region, the noise of it would be blown abroad and the wildest hopes entertained—especially by some well-known company promoters—of fortunes to be speedily unearthed. And yet the value of the gems other than diamonds sold yearly in this country alone must be considerable. From whom do the jewellers procure these gems? We presume they have agents in the different countries who barter direct with the native dealers, or else are supplied by "middle-men" in the form of gem merchants. The native dealers again—we can answer for those in Colombo and Galle—never own any pit or plot themselves, but again deal through agents, whose time is spent purchasing stones from villagers up in the gem-producing districts. Every intermediate profit made is immense. In the districts of Saffragam and Ratnapura the wretched Cingalese, who own small pieces of land beside the streams, where they work like slaves, often up to their waists in water, derive but a very precarious income from their really valuable labours. The travelling moormen who command a little ready money, frequently purchase sapphires, rubies, and cats'-eyes, upon which a profit of a thousand per cent. is deemed to be erring on the side of moderation. Ready money could purchase tracts of gemming land in the most favourable localities, and a systematic plan of jewel-digging be entered on under European supervision. Many of the best rubies never reach this country, but are bartered to native chiefs in a clumsily cut state, often to be buried, lost or hoarded away by some dying miser. Many a fine stone, worth some hundreds in London as a brilliant, has been cut into thin plates resembling glass, changing its value to almost nil.

No European mineralogist has devoted himself to finding out from where these stones spring which are washed down the streams and deposited in layers of gravel under the river bed. We cannot help indulging in fascinating dreams of some huge matrix of jewels high up among the mountains, whose splendour one charge of dynamite might expose. All the gem pits are in low ground. The gems become more and more triturated during their descent down stream, until they are termed "tusi," or dust. This ruby dust can only be used for cutting and polishing. The fact that the supply of these gems is not yearly decreasing, points most plainly to the conclusion that somewhere a matrix exists. Leaving, however, these Utopian ideas alone, the ordinary process of gemming in the low ground is one which should commend itself from its prospect of really handsome profits. If all these dealers, agents, and merchants, both native and European, can manage to make a living from the enterprise, in addition to the heavy profits made by London jewellers on coloured stones, then it would seem rational to suppose that shareholders of a well-managed company might find they had not embarked in an unremunerative venture.

I expect at no distant date to find the chief gem enterprises worked by English companies in the East Indies, just as has been effected with the gold mines, but with perhaps more profitable results. A geologist who can discover the real matrix of the ruby and sapphire, will no longer need to write pamphlets or read lectures in order to gain an income, but will soon be heard of in financial circles as the "Jewel King."

Pearl Diving.—Diving for black pearls employs a large number of men and boats off the coast of Lower California. Traders supply the vessels and diving apparatus upon the stipulation that the pearls that are found are to be sold to them at specified rates. These jewels are of much beauty, and highly prized. A year's production is worth on an average from £100,000 to £200,000.

Gold and Gold Mines.

South Africa.—The Union Company's steamer "Spartan" arrived on the 22nd ulto., bringing 1,731 ounces of raw gold from South Africa, valued at £6,670. This was principally from the new "Sheba" reef in the Transvaal, about which good accounts are given.

On the 8th of June, at the Indian and Colonial Exhibition, was started the Queensland Quartz Crushing Mill. With considerable enterprise the Queensland Government, by no means the largest gold-producing colony of Australia, determined on making a practical display of the methods adopted for the extraction of gold from the matrix. Messrs. Walker & Co. (Limited), of Maryborough, are the manufacturers of the mill which has been erected under the superintendence of Mr. Longden, the engineer, for the Queensland Commissioners. The experts present at the ceremony of starting the mill seemed pleased with the working. The operations of quartz crushing and washing and cleaning the gold will be shown daily. Just beside the mill, the old process of washing alluvial dirt in tub and cradle is shown. For these purposes, quartz and wash-dirt is being sent from Australia.

Big Gold Nuggets.—The largest gold nuggets ever found were the following: The Sarah Sands nugget, found at Ballarat. It weighed 130 lbs. troy, or 1,500 oz; this, at £4 per ounce, would be worth £6,240. The Blanche Barkly nugget, dug up at Kingower; it weighed 145 lbs., and was worth £6,960. The Welcome nugget, found at Ballarat; it weighed 184 lbs., and was sold for £10,000. This was the largest ever found.

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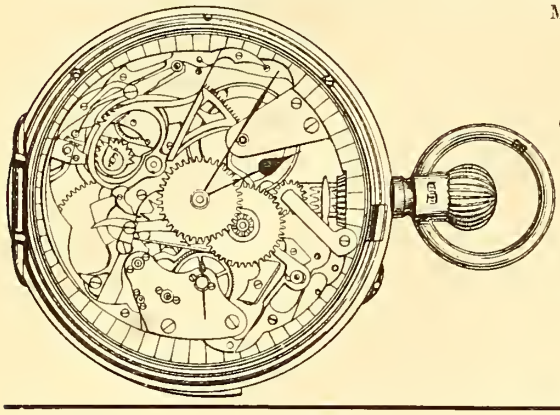

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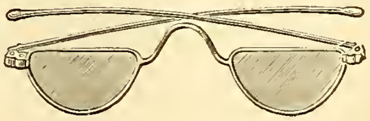

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At the Sydney Exhibition, 1880, two First-Class Awards were obtained; and although the Watches were not expected to be entered for competitive trial, they obtained, at the Government Observatory at Sydney, higher marks than those of any other Exhibitor.

Gold Mining in Victoria.—In the Victorian Court, on June 10th, Mr. R. M. Sergeant, of Ballarat, delivered a lecture on "Gold Mining in Victoria," to an appreciative audience. The lecturer showed that the occurrence of gold and the practice of gold mining in Australia was similar to the occurrence of tin and tin mining in Cornwall, except that gold is found in a metallic state and tin as an ore. The lecturer described in detail the geology of the Ballarat district. The gold miners believe the gold deposits to be the result of the breaking down of quartz, and the disintegration of lodes. There is a difficulty in this way of accounting for nuggets, as no one has ever discovered a mass of gold in any quartz reef in Australia which could, by any process of disintegration, be converted into nuggets such as the famous "Welcome" and others (models of which are to be seen in the Victorian Court); and as a matter of fact there are no such quartz reefs in the localities where the nuggets were found. Collecting alluvial gold is simple, but collecting vein gold requires the reduction of the quartz rock to fine sand by a battery of stamps. These operations were illustrated by the lecturer. Attention was drawn to the fact that in the Ballarat district there are many lodes and mines of mixed ore, ore so mixed with copper pyrites, silver, &c., that though the gold would assay about an ounce to the ton, next to nothing can be done towards securing it, the cost being too high. Here, the lecturer said, is a field for scientific men. Till they turned their attention to the subject, he thought, little would be done.

General Notes.

The Clockmakers' Company.—The Clockmakers' Company have the following notice in a circular issued to the members of the Company on the 14th ulto.:—"The Company having great reason to believe that many of its Members and others who profess the said Trade, and are free of different Companies, do bind Apprentices in such Companies, contrary to the Charter and Bye-Laws of this Company, which require every person professing the said Trade, and being free of this or any other Company whatsoever, and taking unto him or her any Apprentice or Apprentices, shall bind every such Apprentice to some free Brother of this Company only. This is, therefore, to give Notice, that if any Person or Persons using the said Trade, and being free of this or any other Company, shall at any time hereafter take upon him or them any Apprentice or Apprentices, and do not bind such Apprentice or Apprentices to some one free Member of this Society, he or they will be liable to the Penalty of Ten Pounds for every such offence, according to the Charter and Bye-Laws of the said Company. A Copy of the Parish Register, or such other evidence of age as shall be satisfactory to the Court, will be required to be produced with every Person who shall come to this Company for the purpose of being bound Apprentice; and every Master at the time of binding an Apprentice, or making free, is required to produce the Copy of his Freedom, and also to give the Clerk a Week's Notice previous to the day of binding, whenever the Apprentice Fee shall amount to the sum of Fifty Pounds or upwards.

Statistics.—The total number of watches said to be produced annually in the entire world is estimated to be about 3,000,000. The annual production of the United States is now 1,000,000. The total number of key-winding watches made in America since the introduction of machinery in the manufacture, or since about 1850, 3,250,000. Probably over 2,000,000 of these were made during the last ten years.—*Electrical Review, U.S.A.*

Society of Arts Award.—Professor Waldo, of Yale College Observatory, U.S.A., has been awarded a Silver Medal by the Society of Arts for his paper on American Watchmaking Industries, read before that society this session.

Antiquarian Discovery in Aberdeen.—On Monday forenoon, while a number of workmen were engaged in excavations for new premises in course of erection in Ross's Court, Upper Kirkgate, one of their number unexpectedly came upon an ancient pot of bronze, which on examination was found to be quite full of silver coins about the size of modern sixpenny pieces. The pot is goblet-shaped, and was lying about three feet below the surface of the ground. When unearthed it was quite intact, but in the removal one of the legs came off. The majority of the coins, which numbered about 6,000, belong to the reign of Edward I. On many of them is the word "Civitats," followed in some cases by the other word "Wexford" or "Wickford," while the date 1150 was deciphered. The specimens are in good preservation, and local antiquaries manifested considerable interest in the discovery of the precious hoard, which is now in the possession of Mr. Thomson, of Messrs. King & Co., printers. On Tuesday he received a communication from Mr. Charles Duncan, advocate, representing the Queen's Remembrancer, Edinburgh, requesting him to hand over the treasure to that official. Mr. Thomson has agreed to do so, but has made a claim for the value of the coins. It is stated that the purchasing value of each of the coins at the time they were in circulation was equal to about twenty shillings now. The pieces belong chiefly to the reigns of Edward I. and II., and Alexander, while some French coins have also been met with. How the hoard came to be in the place it was found has greatly exercised the minds of local antiquarians, and various theories have been advanced on the subject, the general impression entertained being that the pot and its contents were hidden about the time of the battle of Barra, near Inverurie, between the forces of Edward and Robert the Bruce.—*Scotsman*, June 5th, 1886.

The Duty on Silver and Gold Plate.—With reference to the discussion on Mr. B. H. Baden Powell's paper on "Indian Manufactures, from a Practical Point of View," read before the Society of Arts, Mr. Martin Wood writes to to the Society's Journal:—We have no control over the trade of France or America, but we have absolute power over that of India. We have forced our exports on that country, and both our political parties joined, at the bidding of Lancashire, to compel our piece goods to be admitted into India duty free. In striking contrast with this deference to a clamorous trade interest here, we continue to tax the special industry of the Indian workman in gold and silver plate at a rate that amounts to 30 or 40 per cent. of the sale price, with the effect of excluding his wares from our home market. No one, except the "fair traders," wishes to maintain, in favour of the Indian artisan, a differential duty against other silver plate; but the whole receipt from this barbaric and antiquated impost should be considered as a trifle compared with the relief that its abolition would afford to one of the most suitable and meritorious of the ancient handicrafts of India. That country has protested and petitioned in every form against the maintenance of what is felt as a peculiarly invidious embargo on this branch of Indian industry which, except by special dispensation, is almost shut out of the present Imperial show. No time could be so fitting as the present for abolishing the vexatious exclusion. The Society of Arts has often interceded, by its Council, on behalf of struggling or unfairly overweighted industries, and one could not easily conceive a case more suitable for its intervention than this of the almost ruined silver and gold plate art of India.—*Journal of the Society of Arts.*

Her Majesty's Clockmaker for Scotland.—The Queen has been graciously pleased to appoint James Mackay Bryron, of the firm of Robert Bryron & Sons, clock and watchmakers to the Queen at Edinburgh, to the ancient office of Her Majesty's clockmaker for Scotland.

The Union Company's mail steamer "Trojan" arrived on the 7th ulto., bringing raw gold to the value of over £7,000 from South Africa, the bulk of it coming from the Transvaal Gold Fields.

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WE beg to call the attention of the Trade to our New Price List, dated July 1st, 1886, which will be sent post free on application accompanied with business card.

We believe the market offers nothing of any other make to at all compare with the goods we offer in such a combination of quality and price.

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WHOLESALE and EXPORT for WATCHES of EVERY DESCRIPTION.

All is not Gold that Glitters.—We reprinted in our last issue a paragraph from the *St. Louis Jeweller*, having reference to the Clay watch. It is, perhaps, as well to reprint also a paragraph from the June issue of the same journal on the same subject—"The Clay watch, which I mentioned in my last, is referred to throughout the trade generally only with amused incredulity. That it will keep time like the Waltham, and sell as cheap as the Waterbury, is not believed. Some say it may do well for a short time, but that its construction is such that the parts must soon wear out. There is another firm at Williamstown, Mass., which has been making an effort in the same direction. One gentleman tells me that was the original concern, from which Mr. Clay stepped out. Another says that it has a movement which it claims to be an improvement on the Clay. This movement, it calculates, can be produced for 65 cents ; but in this estimate interest on plant, and a great many other things, are not included. The Williamstown firm, I understand, is endeavouring to raise stock to form a stock company. How much of genuine merit there may be in these revolutionary inventions time alone can determine. Very few can be found who regard them in any other light than as toys."

Damascening by Electrolysis.—A method of damascening metals by electrolysis has been brought out in France. It is thus described in a note laid before La Société Industrielle d'Aix-la-Chapelle :—Two copper plates are put into a bath of sulphate of copper solution, one being connected with the positive pole and the other with the negative pole of a battery. A thin layer of insulating varnish or wax is spread over one of the copper plates, viz., that connected to the positive pole, and the damascened device is etched on it. Now, since copper is by electrolysis transferred from this plate to the other plate, it follows that only the lines of the drawing can be attacked. A battery of two cells is sufficient for this purpose. When the plate has been bitten to the depth of a millimetre it is removed from the bath and treated with hydrochloric acid to remove traces of oxide of copper in the lines of the drawing. It is then washed with water, suspended in a bath of nickel or silver, and connected with the negative pole of the battery. The positive pole now consists of a plate of platinum. The silver or nickel now deposits wherever the copper has been attacked, and the depressions are soon filled with the foreign metal. The plate is then polished, and looks like one that has been damascened by hand.

Olden Time Coinage.—Up to the time of Henry III. only silver and brass were used for coinage, gold being first coined in this country in that king's reign.

An English officer at Venice, walking one day from the Doge's Palace, thought he observed one of the figures on the clock tower of St. Mark's stoop down and take up something. He looked again, and he positively saw the figure take a pinch of snuff. The officer confessed that he was apprehensive he was losing his senses or that his vision was deranged, when an old woman, observing his consternation, soon explained the seeming miracle by telling him that one of the figures that struck the hour being out of repair, her nephew, Jacopo, was engaged as a substitute till the machinery was put in order.

Live Jewellery.—The newest thing out in brooches are live beetles, a fashion which Mme. Judic, the Parisian soubrette, has just introduced from America. Among the numerous presents which this talented artiste received from her admirers was a living gold beetle displaying the most brilliant colours, and capable of being used as a brooch, thanks to an ingenious though complicated contrivance. The insect lives on sugar and water, and can go several days without food.—*Sport und Mode.*

Freak of the Silver King.—Mackay, the millionaire, proprietor of the great silver mines in America, is about to install a smoke-room in his house. This room is to be entirely papered with European bank notes.—*Moniteur de la Bijouterie et de l'Horlogerie.*

Technical Education.—Sir Lyon Playfair, in making the annual statement on national education, in the House of Commons, on the 17th ulto., said, that in many provincial towns technical schools had been fitted up, for which the assistance of Government grants was desired, and that the Science and Art Department was doing good work in promoting technical education in every way.

Sir Henry Holland, on the other hand, doubted whether making technical education one of the subjects of instruction in elementary schools would receive the approbation of the ratepayers ; he thought it ought rather to be provided for out of existing endowments by the Endowed School Commissioners.

Dr. W. Lant Carpenter read a paper at the Conference held at the Indian and Colonial Exhibition, on the 23rd ulto., on "The Position of Science in Colonial Education." Following an account of the present condition of scientific education in the Colonies, he pointed out the value which should be accorded to drawing as an element by which the time-honoured routine of subjects might be varied, and the beneficial results which had been attained by objective illustrations in elementary science. After comparing the public opinion of the Colonies with that of the Old Country, he advocated the establishment of an Australian Association for the Advancement of Science, following the lines of the British and American Associations for the same purpose.

Notes from Edinburgh.

By J. B.

THE jewellery trade of the city of Edinburgh may be divided into two classes, as it might also be said, in the main, to be confined to two streets. One evil, however, has overtaken them both, and one complaint is their continual utterance. For many months there has been an exceptional—and some of the older firms state—an unprecedented dulness in the selling trade.

* * *

Those who keep large stocks complain bitterly of this, and they complain all the more because, in proportion to the lavishness of their display, the customers are in like measure particularly difficult to please. It has produced this result, however, that those who rely upon their front shops alone are doing little, while those who manufacture and keep their own workmen find their hands tolerably full.

* * *

During the early months of this spring, many of the smaller class of working jewellers were busy preparing goods for Exhibition purposes : but the slowness of the sale there has caused a reaction and they are now correspondingly dull.

* * *

There are at present, several pieces of large plate in hand. Among them is one for which there was much competition. It is to be presented to a defeated political candidate of the last election as a consolation for his defeat. Apparently it is not always victory that brings prosperity, for in this case the candidate's loss has been the jeweller's gain.

* * *

The day of silver jewellery in the better class of shops is almost a record of the past : but it has been superseded by a rage for common gold jewellery, which is about as lamentable. The public has been educated to demand an article in gold at a price which formerly used only to produce one in silver. The satisfaction obtained must be small and the result is not difficult to predict.

* * *

The low price of diamonds at present is causing much larger stocks of mounted goods to be kept than has hitherto been done. The rage for æsthetic colours in dress fabrics is also producing a demand for soft-coloured stones, such as the peridot, tourmaline, Alexandrite, spinel and fancy coloured sapphires, which is causing these stones to fetch fair prices. When mounted with diamonds they are effective.

* * *

Fine Oriental pearls are almost dead stock in most establishments in the north. Scotch pearls go freely, but Oriental pearls almost never, and yet their price seems to keep up.

Artistic,
Old Style,
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Hutchings & Crowsley
Limited,

35 to 41, HENRY STREET,
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AND
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EFFECTIVE DESIGNS Prepared,
and
Suitable : Blocks : Engraved,
by
Experienced : Artists.

Those of the Edinburgh jewellers who do a tourist trade are expecting this to be a good season. It is probable that the Exhibition will attract many strangers. We trust they will leave some of their money behind them.

* * *

The alteration in George Heriot's Hospital is not to lead to the dispersion of the plate that Institution possesses. The ancient "loving cup," around which are clustered many associations of old Edinburgh, is to remain in possession of the new body of Governors. It is not, as in many similar cases, to pass into private hands or lose its identity in the melting pot.

Notes from Paris.

By "Quasimodo."

Paris, *June 25th*, 1886.

I DO not know if many readers of *The Watchmaker, Jeweller and Silversmith* are also readers of *Truth*, nor, therefore, if that queer story, "A Jeweller's Bankruptcy," which appeared in its June 17th issue, is known to them. It seems, however, to be based on a report which went about Paris on the morrow of the burglary committed on the premises of Mr. Gabriel Levy, in the Avenue de l'Opèra. It was said that Mr. Gabriel Levy, who is also proprietor of a great tally-shop in the Rue de la Douane, the *Bon Genie*, knew more about the burglars than he cared to acknowledge; but this he indignantly denied and offered a gigantic reward for the discovery of the first person who had set these rumours afloat. His loss was stated to exceed £8,000.

* * *

Apropos of burglars, *ces Messieurs* have of late been very busy, to the great prejudice of our Parisian colleagues. With the influx of English visitors, brought over by the Grand Prix Race, there came also a number of burglars and smaller depredatory fry. The first victim was a Mr. Marcel, in the Place du Havre, whose safe was, one evening during the Grand Prix, relieved of upwards of £7,000 worth of diamonds, gold, watches and miscellaneous jewellery. Many other tradesmen have been likewise despoiled. To-day I hear of a somewhat original trick played on a watchmaker in the Rue Ramey. He was visited yesterday, at noon, by two persons, one of whom was known to him as a customer in the way of repairs. The alleged object of their visit was to discuss the repairs needed by a gold watch, which they produced. After some further conversation they invited Mr. G. to lunch, and during the lunch proposed to him to purchase a quantity of his goods. The trio accordingly returned to the shop, where the two confederates selected about £60 worth of miscellaneous goods. These they packed up in a napkin, and handing the parcel to the watchmaker, requested him to keep it till the evening, when they would come and settle the price. They specially recommended him not to open it, nor to interfere in any way with its contents. Mr. G., good, simple man, enchanted, doubtless, with this unexpected stroke of business, locked the parcel up before them, and handed them the key of the drawer, as the best means of convincing them that they would find their purchases intact and undisturbed on coming to reclaim them that evening. Evening came, but not the two customers, and when, his suspicions being aroused, poor Mr. G. broke open his drawer and examined the parcel, he found that instead of £60 worth of miscellaneous jewellery, it contained nothing but rags and pebbles. The two confederates had, with rare skill and audacity, substituted another packet for the one containing the goods. In this matter nothing surprises me but the extreme simplicity of the watchmaker. This substitution has been played so often, notably on a recent occasion at the Palais Royal, that I cannot understand how a tradesman can permit strangers to pack up goods before paying for them. And yet the sharpest are liable to be swindled. Was not Mr. Otterbourg, of the Boulevard des Capucines, robbed the other day of the change of a £20 note, which was tendered and immediately afterwards withdrawn?

* * *

The tombola of the Fêtes of Parisian commerce and industry is to be drawn on the 15th of July. The principal prize is to be a rivière of diamonds, estimated to be worth 62,500 francs, or £2,500, with the option to the winner to receive in its stead a cash prize of £2,000. This rivière will be composed of forty diamonds of different sizes, but of identical quality. The diamonds are to be supplied by forty jewellers in Paris, one diamond from each shop, so as to divide the order. The committee has addressed a circular to the jewellers and diamond merchants of Paris, inviting them to tender, and the first forty who apply will receive the orders. The diamonds will be set in gold-plated silver and the setting of them will be entrusted to the syndical chamber of *ouvriers bijoutiers*, working jewellers. In case the winner of the first prize prefers to have the cash payment, the diamonds will be returned to the jewellers, who will receive in compensation the portion of the gold-plated setting fitted to each stone, the cost of which will be borne by the committee. This seems to me a fair and equitable arrangement. The rivière will be presently exhibited with the 3,000 other prizes to be drawn for in this lottery, at the Hôtel de Ville.

* * *

I regret to see that the number of tallymen who offer watches and jewellery for sale on credit by monthly payments increases each day in Paris. I consider this kind of business infamous. Not only are the goods supplied of the most inferior quality, so that the money paid by instalments represents ten times their value, but also this system puts temptation to extravagance and, too often, to worse failings in the way of many people. The climax of tally-dealing has, I think, been reached by an *industriel* in the Rue Lafayette, who sells false teeth on credit. Fancy the moral degradation that a man must feel, conscious that not even his person is entirely his own property. We shall hear of coffins being sold on credit next.

* * *

Apropos of dealing on the tally system, a new company, rejoicing in the amazing denomination of the *Universal Commission Administration*, and which has its office in the Rue de la Sorbonne, is flooding the provinces with circulars referring to a grand new discovery in *or fèvrerie*, or goldsmiths' work, said discovery being of a new kind of metal called Métal-Diamant, or Diamond-Metal, by its inventors, which is said to be equal to real silver, while costing the fourth of the price of ruolz, or electro-plate. This Diamond-Metal is fashioned by the Universal Commissioners into spoons and forks, and is sold on credit to "respectable and responsible persons *only*," at the rate of twelve francs the box, containing six table-spoons, six forks, six coffee-spoons and a soup-ladle, the twelve francs to be paid at the end of four months. And, as the circular points out, it is only necessary to economise one penny a day to be able to discharge the debt in the allotted time. Not blinded by 60,000 certificates testifying to its excellence, I am prepared to say, after a careful examination of the Métal-Diamant, that long before the four months can elapse, the purchaser will discover that the solidity, beauty and cheapness of this new invention exist only in the pericraniums of the Universal Commission Administrators.

* * *

I hear that the new *porte bonheur*, or luck-bringing trinket, for the ensuing season, is to be a double cherry, the stem and foliage being of 18 carat gold and the fruit in glass or garnets. The notion of this is that as one *guigne* (the word guigne means either cherry or bad luck) is unlucky, and as according to the tenets of superstition two unlucky things counteract each other and form one lucky thing, the two *guignes* will be certain to bring fortune to the wearer. This original idea, I believe, sprang from the active brain of jeweller Otterbourg.

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(ESTABLISHED 1839)

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ENGLISH AND GERMAN
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WHOLESALE AND EXPORT

Chronometer, Watch and Clock Manufacturers,

Marine and Pocket Chronometers, and all kinds of Printing Chronographs, Keyless, Duplex, Independent, Dead Beat and all kinds of Centre Seconds and First-Class Lever Watches, Regulators, &c.

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WATCHES FOR THE BLIND.

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French Clock Manufacturers.

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THE LARGEST STOCK OF

CARRIAGE & FRENCH CLOCKS (own make).

CARRIAGE CLOCKS (own make) PATENTED.

Vide Horological Journal, July, 1881.

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DIAMOND MILLS, CLERKENWELL ROAD,
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JURORS' MEDAL, INTERNATIONAL EXHIBITION, 1862.

SPECIAL NOTICE.

Having acquired adjoining premises, which we have adapted specially for the departments of **Tools and Watches**, our improved facilities will, we trust, prove to the convenience of our customers and the Trade. We invite attention to our extensive Stock in all our departments, and specially to the improved **Boley and other Tools and Appliances**, for which we had the Highest Award at the Inventions Exhibition, viz., **Silver Medal**, for Improvements in Watch and Clockmakers' Materials and Tools.

The most remarkable of all the presents offered to the Princess d'Orleans on the occasion of her marriage with the Duke de Braganza was without controversy the gift of the ladies of Brittany, a solid silver statuette, weighing upwards of 20 lbs., of Saint Anne d'Avray, the patroness of Brittany. The work, metal and engraving were all excellent, and it is a pity that the name of the silversmith who executed this masterpiece cannot be made public. A similar present was offered by the ladies of Touraine.

* * *

The diamond, once the lode-star of the female ambition, has sunk as much as land in the general estimation. At least in Paris this is the case. The vulgarisation of this gem, and the number of clever imitations of it with which the market is flooded, are the causes of its depreciation. I know more than one haughty dame in the aristocratic faubourg who refuses to wear her ancestral diamonds, on the ground that they are much too common to deck her person. Whether this is really their sentiment, or whether it is a cunning device to force their lords to supply them with less common jewellery, as the ruby, pearl or sapphire, must for ever be an unanswered question.

* * *

Excellent value in the way of watches is being offered to the public by Mr. Vouillarmet, ex-president of the Society of Watchmakers, established now in business in Besançon. Twenty-two francs, or 17s. 6d., is surely a low price for a silver-cased watch, *à cylindre*, with eight rubies and a two years' warranty.

Commercial Failures.

According to *Kemp's Mercantile Gazette*, the number of Failures in England and Wales gazetted during the four weeks ending Saturday, June 26th, was 344. The number in the corresponding four weeks of last year was 349, showing a decrease of 5, being a net increase, in 1886, to date, of 203.

The failures were distributed amongst the following trades; and, for comparison, we give the number in each, in the corresponding weeks in 1884 and 1885 :—

	1886	*1885*	*1884*
Building Trades - - - - -	32	43	20
Chemists and Druggists - - -	3	8	2
Coal and Mining Trades - - -	7	7	5
Corn, Cattle and Seed Trades - -	10	10	5
Drapery, Silk and Woollen Trades - -	38	48	20
Earthenware Trades - - - -	5	2	1
Farmers - - - - - - - -	26	23	9
Furniture and Upholstery Trades - -	10	11	2
Grocery and Provision Trades - -	52	43	40
Hardware and Metal Trades - - -	16	11	7
Iron and Steel Trades - - - -	12	22	12
Jewellery and Fancy Trades - - -	22	15	7
Leather and Coach Trades - - -	25	22	18
Merchants, Brokers and Agents - -	13	18	24
Printing and Stationery Trades - -	4	14	3
Wine, Spirit and Beer Trades - -	22	23	14
Miscellaneous - - - - - -	47	29	38
Totals for England and Wales—	344	349	227
Scotland - - - - - - - -	106	96	87
Ireland - - - - - - - -	18	13	18
Totals for United Kingdom—	468	458	332

The number of Bills of Sale published in England and Wales for the four weeks ending Saturday, June 26th, was 1,050. The number in the corresponding four weeks of last year was 1,046, showing an increase of 4, being a net increase in 1886, to date, of 209.

The number published in Ireland for the same four weeks was 83. The number in the corresponding four weeks of last year was 65, showing an increase of 18, being a net increase in 1886, to date, of 152.

Legal.

LORD MAYOR'S COURT.

Saturday, June 12th.

(*Before* Mr. Woodthorpe Brandon, *Assistant-Judge, and a Jury.*)

BIRKETT *v.* LARARD.

Plaintiff sued for £12 damages for wrongful conversion of a gold watch by the defendant, who carries on business under the name of Frodsham & Co., chronometer makers to the Admiralty, 31, Gracechurch Street.

Mr. Scott appeared for the plaintiff, and Mr. Abrahams for the defendant.

Plaintiff stated that he was a dealer, of Bromley, Kent, and was in the habit of attending auctions, and in January last he attended a sale at Messrs. Johnson & Dymond's, Gracechurch Street, and on that occasion he purchased a watch (produced) for £7 15s. He handed it to a Mr. Innes, to try and find a purchaser for it, and Innes offered it to Mr. Robins, the manager of a restaurant at 62, Gracechurch Street. The latter, seeing the name of Frodsham & Co. engraved on the plate, took it to defendant's shop to ascertain whether or not it was a genuine one of their make, and the assistant there told him the watch was spurious; that he should detain it, and that he (Robins) must send the owner for it. The assistant gave him a receipt for the watch, which he handed back to Innes, who in turn gave it to the plaintiff. On January 18th plaintiff went to the shop and asked for the watch back, when the assistant asked him where he bought it, and what he paid for it; and in proof he fetched a catalogue, showed him the number of the lot, and likewise the number of the watch. It was described in the catalogue as "an excellent gold lever watch by Frodsham." The assistant said it was not Frodsham's make, and that he should detain it for the purpose of erasing the name. Plaintiff told him that by doing so he would deteriorate the value, and also damage the watch, so that it would be of no use to him afterwards. He said he would not give up the watch, and plaintiff might take what proceedings he liked. He applied several times to have the watch returned, and after two or three months they offered to let him have it on payment of 12s. 6d. for taking the name off. The value of the watch was from £12 to £14; it would not be worth more if it were a genuine "Frodsham."

The learned Judge said the only question for the jury was whether plaintiff consented to the defendant's erasing the name of Frodsham & Co., and also to pay for that erasure. Was it likely?

For the defence it was argued that plaintiff did not seek to recover the watch, but the sum of £12, although he only gave £7 15s. for it; therefore he was trying to make a profit out of the jury box.

Defendant was called to prove that Robins acquiesced in the name being removed.

Mr. Abrahams said the defendant, on finding this watch was a spurious one, could have obtained an injunction in the High Court, which would have cost plaintiff a hundred pounds, or taken the case before a police magistrate and have had the watch destroyed.

The learned Judge said that was what he was bound to do, and it was no use putting such a point to the jury.

Defendant said he had three or four "forgeries" on his premises, and he offered to get the name filed off; but plaintiff said he did not want that, he should like it done properly. It was an old Coventry watch, and they had hundreds of such "forgeries" from that town. The watch was only worth £4, whereas if it was a real "Frodsham" it would be worth 20 guineas or more. The watch had not been injured in any way by the erasure of the name.

The learned Judge pointed out that the defendant had no answer to this claim unless he could prove that plaintiff left the watch for the purpose of having the name erased at his expense.

The jury found a verdict for the plaintiff, for the full amount claimed.

Trade Notes.

Messrs. Silber & Fleming.—The firm of Silber & Fleming, of 57, Wood Street, E.C., was registered as a private limited company on the 24th ulto. Mr. A. M. Silber, however, continues sole proprietor, the six additional shareholders necessary to comply with the Companies' Acts being all old assistants of the firm.

Mr. J. W. Benson, of Ludgate Hill and Old Bond Street, has been appointed Crown Jeweller to the Sultan of Johore.

The first meeting of the creditors under the failure of Max Haider, who is described as a diamond merchant, of 65, Hatton Garden, was held on June 21st. The receiving order was made on the debtor's own petition, and the accounts showed total liabilities £19,901, of which £15,153 were unsecured, against assets £2,240. The debtor states that he commenced business in 1880, and attributes his failure and deficiency to losses on his trading since 1884. There was no offer, and resolutions were passed for bankruptcy, Mr. John Secar, accountant, being appointed trustee of the estate, with a committee of inspection.

APPLICATIONS FOR LETTERS PATENT.

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, and 6, Lord Street, Liverpool.

6,979. Frederick Clews, 34, Caroline Street, and John Argyle, 12, Branston Street, both in Birmingham, for "A double safety brooch fastener." Dated 25th May, 1886.

7,166. George Albert Brown, 17, Miranda Road, Highgate, N., for "An improved connection or arrangement in sleeve links in the method of attaching the front or face plates to each other." Dated 28th May, 1886.

7,170. George Egginton Carter, 77, Colmore Row, Birmingham, for "Improvements in the fastenings of ear-rings, applicable for chains and other fastenings." Dated 28th May, 1886.

7,332. James Hart-Davies, a communication from John McDonnell, Ceylon, for "An improved fastener for buttons, watchchains, guards, and other similar articles and appliances." Dated 1st June, 1886.

7,564. Robert Brown, 55, Marygate, York, for "An improvement in stationary clocks, whereby they are wound by atmospheric pressure." Dated 5th June, 1886.

7,614. Herbert Dalgety, 1, Upper Winchester Road, Catford Bridge, Kent, for "Improvements in solitaires, studs, buttons, or any such-like fasteners." Dated 7th June, 1886.

7,725. John Richards, Frederick Jenkins, and Samuel Jenkins, 128, Colmore Row, Birmingham, for "An improved, combined brooch and flower holder." Dated 9th June, 1886.

7,734. Charles Antonio McCalla, 15, Great Hampton Street, Birmingham, for "A solitaire or fastening for dresses, cuffs, boots, gloves, &c., to be called 'The Triumph.'" Dated 9th June, 1886.

7,767. George Frederick Bentner and Albert Antoine Lateulère, 47, Lincoln's Inn Fields, London, for "Improvements in musical boxes or other mechanical instruments driven by springs or weights." Dated 9th June, 1886.

7,835. John Darling, 115, St. Vincent Street, Glasgow, for "An improved watch key." Dated 11th June, 1886.

7,840. Thomas Bassnett, 77, Colmore Row, Birmingham, for "Improvements in the mechanism for winding and setting the hands of keyless watches." Dated 11th June, 1886.

7,977. James Henry Smith, 3, Hetley Road, Shepherd's Bush, W., for "Improvements in sleeve links, studs, and the like." Dated 15th June, 1886.

8,181. James Grieve Lorrain, Norfolk House, Victoria Embankment, London, for "Improvements in electric clocks." Dated 21st June, 1886.

Meetings, &c., for the Current Month.

Horological Institute.—Visit of members to the Small Arms Factory, Enfield, Wednesday, 7th. Half-Yearly General Meeting, Thursday, 22nd.

Horological Club.—Annual Dinner, Cock Hotel, Epping, Saturday, 10th.

Clockmakers' Company.—Quarter-Day Court at the Guildhall, Monday, 5th.

Clock and Watchmakers' Asylum, Colney Hatch.—At the Quarter-Day Court of the Worshipful Company of Clockmakers, which will be held at the Guildhall on the 5th inst., the nomination will take place of an inmate of the Asylum.

Society of Arts.—Conversazione at the Colonial and Indian Exhibition, Friday, 16th.

Geologists' Association.—Conferences at the Colonial and Indian Exhibition, 3rd and 17th.

Correspondence.

All Letters for Publication to be addressed to the Editor *of the* Watchmaker, Jeweller and Silversmith, *Imperial Buildings, Ludgate Circus, E.C.*

THE "INVENTIONS" MYSTERIOUS AWARD.

Sir,—The *Horological Journal* of May last contains an announcement that the "Inventions" Jury Commission had awarded a copy of the Diploma of Honour, presented to the Institute, to six exhibitors in the Institute's show case.

The question outsiders would like answered is, What are the recipients and the public to understand by this act? A *copy* of another person's award is simply evidence of the original having been awarded. Did these six dispute that fact? and, if not, why did they need a copy at all? Would not a letter have done as well? And why should not every member of the Institute have a copy, if they wish it, as much as these six members?

This award was presented to the Institute in recognition of its work in technical education. The Institute exhibited the Students' work in a case. These six gentlemen wished to exhibit in the same case, and thereby excluded themselves from participating in the competition with other exhibitors for gold and other medals, because corporate bodies were not allowed to compete for prizes. On learning this fact, they asked that the rule should be relaxed in their favour, and that they should be allowed to participate. In vain they appealed and protested. At last they were told they might have a copy of the Diploma presented to the Institute, but they could not have any distinctive award. Now that they have it, what use is it to them personally? It is not their award; and yet, why was it given at all? If they were entitled to compete, they should have demanded their rights, and have rejected this sop with disdain! If not, then the Jury Commission have acted unjustifiably, for they refused to adjudicate upon the respective merits of these exhibitors, and yet have given them a copy of the highest award; and if any of the recipients are unscrupulous enough, they may tell the world they have been awarded a Diploma of Honour—and only those who are initiated would be able to distinguish between a copy and an original award. The injury to those who have really taken awards or medals is easily conceived, for they are placed in a subordinate position to those who have never been adjudicated upon at all. Such a farce degrades public Exhibitions.

Yours truly, "Horologist."

Answers to Correspondents.

Sully.—Henry Sully, an Englishman, was born in 1680. He served his apprenticeship to Gratton, a watchmaker of London, and afterwards settled in France, where, under the patronage of the celebrated John Law, he established a watch manufactory about the year 1714, which, however, was a financial failure. His principal efforts were directed to the construction of instruments for discovering the longitude at sea, in which he was encouraged by Sir Isaac Newton. He is spoken very highly of by the French horologists of that period; and the short account of his life, written by Julien Le Roy, is at once a tribute to the genius of Sully, and to the magnanimity of his friend and biographer.

The Watchmaker, Jeweller & Silversmith.

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Editorial.

THE speech delivered by M. Rodanet, President-Director of the School of Horology of Paris, on the occasion of the fête held on the 27th of June last, to celebrate the distribution of prizes in connection with that School and the Syndical Chamber of Horology (a translation of the principal portion of which will be found in another column), should be especially interesting and instructive just now to English horologists, both as marking the efforts the French are making to revive an almost lost industry, and as indicating a method by which this may be accomplished.

The English character, in whatever else it may be wanting, is usually credited with the salient feature "perseverance," and, when once an initiative is taken by a portion of the community (the goal being shown to be attainable), the community generally follow it to a successful issue. Let the groove be only well defined, and there is no lack of energy to be complained of in those who are once in it.

But English watchmakers, at all events of late years, have not been distinguished for much (excepting their usual plodding thoroughness) besides resignation; and this quality, however much it is to be admired in some circumstances, is not the most effective ward with which to meet an ever increasing vigilance and activity on the part of our friend the enemy.

The rock on which most of those who discuss the question as to the future of the English watch trade are splitting, at present, seems to be the choice of a particular system of manufacture. But the want of unison in the various suggestions which are made from time to time shows the futility of expecting the adoption of any uniform system while these scattered opinions are so much at variance with one another.

It appears to us, indeed, that the establishment of some bond of union among the manufacturers themselves is just now of even greater and more pressing importance to the home trade than the choice of any particular system whatever.

That the French are fully alive to the importance of such a union is evidenced by the existence of their Syndical Chamber of Horology and the vigour with which it is now acting; and the members of the English watch trade would do well to take pattern by our intelligent neighbours, by the formation amongst them of some such body, before they are convinced that a people who formerly held a high rank for their chronometrical productions can do so again, and that a nation which takes the lead with its art manufactures may prove a formidable rival in a market which has been hitherto left comparatively undisturbed by foreign competition.

Exhibition at Bingley Hall, Birmingham.—The arrangements in connection with the visit of the British Association to Birmingham are now nearly completed, and the Exhibition at Bingley Hall, to be opened on the 26th inst., which is the principal item in the programme, will, it may be confidently predicted, prove of the utmost importance to all the manufacturers concerned.

The applications for space have already far exceeded the room at the disposal of the Committee, and the greatest interest in the success of the undertaking is manifested by the manufacturers of the town and district.

The fatal mistake that was made by the English exhibitors at the Inventions Exhibition (which we pointed out at the time), in not showing any machinery in motion, or methods illustrative of the processes of manufacture and of the results arrived at, which had such a bad effect on the trades interested, in letting the public believe that we were behind the foreigner in our methods of production, is now in a fair way of being rectified, and the exhibits of Messrs. Spencer & Sons, diamond-cutting and polishing: W. A. Carlyle, The Potosi Silver Company and Elkington & Co., electro-plating; F. Derry and J. Thomason, silversmithing; N. C. Reading & Co., G. E. Walton & Co., Levi & Solomon and Levitus Bros., jewellery; Phillips, Son & Entwisle, gold-beating; Browett, Ashbury & Co., metal spinning; C. Carr, bell-founding; The English Watch Company, watchmaking; and others, should give a great impetus to the trades mentioned, not only in the Midlands, but over the whole of the country generally.

The Paris Syndical Chamber of Horology and Horological School.

THE distribution of the prizes of the Syndical Chamber of Horology and of the School of Horology of Paris took place in the Large Hall of the Trocadero on the 27th of June last, in the presence of a large and enthusiastic audience.

The sitting was opened by M. Rodanet, the President-Director of the School, in an address, of which the following is a translation of the principal part:—

"It is about fourteen years since the members of the horological industry, of which we are the modest representatives, moved in a lively degree by the considerable progress made by the foreigner in this art of high precision, due to the co-operative movement which then produced it, felt the necessity of uniting themselves more closely together, in order to study in common the questions of all kinds belonging to the production and commerce of French horology.

"The Syndical Chamber of Horology of Paris was created under that influence. From its *début* this new corporate body saw the urgency of organising the instruction, both technical and professional, in a rational and truly practical manner. Its principal efforts were immediately made in that direction.

"The Annual General Conference was established. At this Conference, of which we to-day celebrate the twelfth anniversary, the Syndical Chamber of Horology of Paris admits, you know, Gentlemen, without distinction of nationality, all the patrons, workmen and apprentice horologers of France; all those who, domiciled in our country, have industrial interests relative to our profession. The annual conferences, from their origin, had a marked development; they have to-day a considerable importance. The prizes which are awarded are of great value, and the quantity and quality of the competitors who take part augment year by year.

"We should do better yet, Gentlemen, if all the Parisian workmen, who are remarkable for their ability, comprehended that it would be to their interest to devote, each year, some weeks of their time in favour of our assembly. Even in their usual course of action, these workmen carried off (I do not doubt, to the satisfaction of our juries) prizes of greater value than those which were awarded to many of their foreign competitors in the great international tournaments of 1867 and 1878.

"This year many candidates of real merit have been presented for the special prize of good conduct, morality and work. It is with lively satisfaction I note that there still exists a good number of old workmen, constant, faithful, very meritorious, as much from the point of view of honourableness as of professional qualities. In the presence of this plurality of candidates of equal merit with one another, the Syndical Chamber has decided to reward two artists instead of one, as it did the preceding years.

"The establishment of the Annual Conference was only the prelude of more considerable efforts that the Syndical Chamber of Horology of Paris wished to make in the organisation of professional instruction. We all had the firm wish to found in Paris a centre of instruction, to create in this active, intelligent and rich medium a veritable technical school, in which the tuition of our art would be given in all its branches, theoretically and practically, with method and uniformity. This project, seriously studied and discussed to the bottom, was definitively admitted in the General Assembly of the Syndicate of Horology of Paris, on the 12th of July, 1880. The School of Horology of Paris was founded. In the same year about 50,000 fcs. were received.

"The statutes of the new Society, the programmes of tuition, the interior rules were elaborated; in short, on the 6th of March, 1881, in a solemn session presided over by M. the Director of Interior Commerce, delegated by the Minister of Commerce, the new School was inaugurated. You see, Gentlemen, imbued with the duties we have to fill face to face with our Corporation and with society, we acted vigorously, and with so much the more ardour, as it appeared to us, and does still, that the best response to make to opponents is to quickly resolve the problems set. Moved by an energetic resolve we went forward, without being disturbed by timid spirits. We were certain that by acting in this way we should quickly obtain the serious support of the Government, of the Municipal Council of Paris, and of that numerous *pleiad* of intelligent men and good patriots who desired the raising up again of La France by labour; of those who are ready for all sacrifices, which have in their result the instruction of youth, to give it strong arms for the struggle of life; of making, in short, the country great and powerful by the intellectual and moral superiority of her citizens. Our efforts ought to be crowned with complete success. On the 12th of July, 1883, the Government of the Republic, convinced that we had already rendered, and that we had the power of rendering still more true services, gave us legal life, and assured us the possibility of developing ourselves, in recognising by presidential decree the School of Horology of Paris, 'establishment of public utility.'

"The syndical work, which we had created at so much pains, had assured the chance. It (the decree) only acted in completely improving it. The Administrative Council of this School, composed of men belonging exclusively to the industry and commerce of horology, had every facility to act. The work, founded by private initiative, was not shackled by troublesome and annoying administrative restrictions, and the entire experience and knowledge of its founders was able to be largely and vigorously utilized; so that the School of Horology of Paris, free from all restrictions, became at once an institution of the first order.

"Since its foundation, this technical school has given instruction, manual and theoretical, to 119 pupils, who are thus composed: 73 Parisians, 41 provincials and 5 foreigners. In addition to this number, 28 bursars have been instructed gratuitously. We should be happy to take to our charge a larger number of non-paying pupils, but our expenses are heavy and our supplies modest; we ought, therefore, to reckon with extraordinary expenses.

"As the figures above mentioned show, the number of strangers admitted as pupils to the School of Horology of Paris is small. It were wise, in the meantime, to leave the door of our establishment open to our neighbours; in this, the Council has followed the example of the State who receive foreigners in the superior commercial, industrial and military schools of the Government. We have acted with so much the more good sense in arranging this matter, inasmuch as a good number of my colleagues and myself cannot forget that it is with the stranger in the schools and in the Swiss or English manufactures, that we have completed our instruction and our personal education.

"Besides the number of pupils admitted in our workshops, eleven could not complete their apprenticeship from various causes and thirty-two have gone out as workmen and have been placed by the care of the School of Horology of Paris in the best houses of Paris and of the province. [The speaker here gave a list of the pupils who were placed by the School in situations.] In short, we are about to reward pupils of an incontestable ability of manipulation, whose apprenticeship is not yet terminated. An examination of the productions, which we have exposed in this palace, will superabundantly prove to each the value of our methods of instruction. I do not fear to say, Gentlemen, in this assembly of horologers, many of the works of our pupils are perfect, so perfect that, there is not the shadow of a doubt, they will permit us to struggle with advantage in 1889 against the foreigner. These results, verified in a report made by a Swiss jury at the Universal Exhibition of Anvers in 1885, these results, which were worth to us a diploma of honour in that international concourse, are entirely due to the rational methods of instruction adopted by the Council of Administration. In the primary and secondary instruction, the programmes are discussed, and, after having been admitted, they are scrupulously followed. In technical and professional instruction, all is done without method, all is left to chance. Why not proceed in the same fashion in the two cases? Before making a child write, do we not teach him, in the first place, to hold his pen properly, to give to the characters which he traces a good direction, to form his letters at the beginning by the most simple and easy method? Why not conduct manual instruction in the same fashion?

"The horological pupil, before spending a long time in the execution of a difficult piece of work, should previously know how to file, turn, temper, polish and flat; to file correctly and with certainty, in the large vice, in the hand-vice, upon a pin, between the fingers; to turn round, with truth, copper, steel, tempered steel. This is not easy, especially if one takes into account that the practice of turning ought to be alternately carried out on the turns and on the foot-lathe. The pupil thus prepared—if one has been strict in the methods of execution, if nothing has been looked over, if one has constantly required of him perfect work, absolute precision—be certain, Gentlemen, that the work he will execute in his second and third year will be good; and that after having made of this child, if he is well endowed, an able workman, he will afterwards become an artist in the strict sense.

"Drawing requires a very practical instruction. Pure theory should be avoided; it is necessary to profit by all the circumstances that hand-work offers to the professor for making applications to the study of design. The refinements of description will be thus obtained without excessive efforts. In the presence of these results, the number of pupils of the School of Horology of Paris has rapidly increased. By reason of this increase it was impossible for us to remain any longer where we are.

"The construction of a large School, capable of receiving a hundred pupils, was become obligatory; it was decided upon. It is necessary indeed, that we should have a short delay, in order to secure the largest and most perfect conditions of installation. In our new situation, which will allow of a development of 1,150 metres superficial, we can organise our work definitively. The workshops, the lecture halls, and the dormitories, will be in sufficient number, well ventilated, and arranged according to our professional wants. The surveillance under these conditions will be easy. All the services, the refectories, the general administration, the library, will be equally organised by a numerous staff.

"With the design of improving this new School, the General Assembly of the Members of the School of Horology of Paris has decided on the issue of a loan of 300,000 fcs., divided into 600 bonds of 500 fcs. each. The bonders, that is to say, the baillers of the funds, the lenders, agree that this loan shall be repayed from the beginning of 1890 in thirty years. The loan voted, 100,000 fcs. were immediately subscribed without special propagation. Everyone desired to profit by the circumstance to lend us serious and sympathetic help. Could it be otherwise? No! Nobody dared, without motive, to check our plans. In the face of numerous sacrifices, and of the sincere devotion of the founders of the School of Horology of Paris, one senseless or dishonest man alone dared to hamper the complete development of our projects. It is that the philanthropic and disinterested work that we had created in the aim of serving the general interest is dear to the corporate bodies. Its complete realisation, one cannot doubt, will not only be a right of glory for the Syndical Chamber of Horology of Paris, but also for the professional syndical groups of which we make part. I think it useless to remark, Gentlemen, that the repayment of the bonds does not present any difficulty. The admission of a hundred pupils will give receipts superior to the expenses. The supplement of rent, at present 7,000 fcs., will be largely compensated for by the addition of 13,000 fcs. under the School Acts, and by a diminution of the expenses, consequent upon a more complete internal organisation. In short, the rent will be annually diminished, not only by the redemption of the bonds, but also by the abandonment, by certain among us, of the profit of the work.

"At the beginning of this speech, I said that the horological industry is profoundly troubled by the new methods, more numerous and more perfect each day, of mechanical production. These changes, which transform the workshop, the manufacture, in working, have taken place during the course of the last six years.

"I am very partial to this automatic machinery which, in our days, replaces more and more the hand of man, but I would wish above all that it served to produce better work and at a lower price. It is not, however, always so. The dealers, the sellers, without conscience and without professional knowledge, have inundated the market with rubbish, which in cheating the buyer lowers our industry. It is necessary that the public should be warned against the incapacity of those who do not understand the first sign of our art, so complex and so difficult. Unfortunately the public does not possess the special knowledge for judging the value and the quality of the objects which it desires to acquire. It cannot render an exact account of that to which it accords its confidence.

"Mechanical production, well directed, is called upon to render immense services to commerce, to industry, to humanity. It will allow to each person the purchase of a watch, it will democratize the hour by putting it in every pocket. The hour, do not forget, Gentlemen, is, in life, order, regularity, health, and, consequently, often riches.

"That we can organise in Paris a manufacture of good watches, by means of mechanical processes, I am absolutely convinced. My appreciation in this matter has certainly its value, seeing that I have been myself a workman, during eight years, in Switzerland and in England. I have lived by manual work in these manufacturing centres, and I affirm that the day on which an intelligent man appears, having the necessary commercial and industrial qualities, enjoying a good reputation, and having at his disposition the necessary capital, the Parisian manufacture will be made, and the Paris watch will retake the front rank that it formerly occupied among similar products. This is in so far true that the Americans have had for some months the idea of founding a watch factory in Paris. If this American idea has not been put in practice, it is because our *confrères* have absolutely refused their consent to the proposal of that foundation.

"Consulted myself in that respect, I have declared, with many of my colleagues of the Syndical Chamber, that we would combat the American manufacture to the uttermost, that we would put the public on guard against the dissemination of productions generally of bad taste, and (always at an equal price) inferior in quality to European productions.

"In short, our liveliest desire is to revive in Paris the watch manufacture, to give to that production an essentially French, (I will say more) an absolutely artistic and Parisian character. There is the second part of the programme which the founders of the School had the absolute conviction of bringing about. You see, it is indispensable to make a final effort.

"Aid us then to place the few bonds of our loan which are yet to be disposed of. In acting thus you would act the good patriot and the sincere philanthropist. Do it, and in two years we shall have the happiness of inviting you, Gentlemen, and you also, Ladies, whose devoted concurrence is so precious to us, to the solemn inauguration of this new centre of technical instruction, the first created in France, due to the devotion and the abnegation of a professional syndic."

M. Rodanet concluded his speech by asking the meeting to accord a vote of thanks to the deputies and representatives present of those bodies which had contributed to the success of the School, his peroration consisting of a warm eulogium on M. Herédia, the president of the meeting.

Watch Jobbing.

By X. O. N.

THE term watch jobber, like many other trade terms, such as watch finisher, &c., is not very appropriate, nor would it be easy to trace its origin. It may have been applied to those who followed this branch of watchmaking by accident, or it may have been conferred on the repairers of watches by some of their fellows as conveying some contempt for their calling, or from the manner in which they did the work entrusted to them. The term, however, although it is not the highest one that even those who are engaged in the occupation care to associate with their names, does not now convey any disrespect or reproach, and as it requires a very skilful and experienced workman to be a good jobber, it should not do so; should, however, the class of watches that are now flooding the market continue to find favour with the British public, the men whose lot it will be to mend them or make them go will not be the subjects of envy, nor will anything that I may say here be of much use to them. These articles will be written primarily with a desire to impart practical information to a large and increasing number of watch jobbers, whose early education has not afforded them the opportunity of acquiring the knowledge necessary to enable them either to understand or handle really good work, while at the same time it is hoped that any layman who feels sufficient interest to read them may find a little information in a subject of some importance to the public, and almost as mysterious as the composition and vending of quack medicines.

The knowledge and capacity of watch jobbers is not increasing in the same ratio as their numbers, and in order to account for this I will go back a few years and compare the education of the learners and apprentices of the not very remote past with that of the present. Formerly the best class of watch jobbers were the sons and apprentices of country watch and clock makers, who learned first to be clockmakers, before the advent of German and American clocks extinguished clockmaking in England. These youths could file and turn, they had generally received a better education than the city apprentice, and they also obtained that knowledge most important to a watch jobber, as to the relative sizes of wheels and pinions and how to pitch a depth correctly; and, as the striking parts of clocks and watches are all constructed on the same principle, a clockmaker's apprentice had a great advantage over one who was first set down to watch finishing and escapement making, and when he had learned one or both of the latter branches he would then with a little practice be fit to undertake the repairs of the best watches. Repairing then meant what it should now mean, viz., replacing a worn or broken part in such a manner that it could not be detected as a repair, but was equal to the piece it replaced when new. Workmen of this class were duly appreciated and fairly paid by their employers, worked on the premises of all the best watchmakers who had a good name and valued it, and although watch wearers paid a good price for repairs, they had value for their money: and one even now comes across an old watch by Vulliamy or McCabe, which has always been in the hands of competent persons, almost as good as when it was new. The modern system of what is called going with the times is altering all this. Watches grow worse daily; co-operative stores and others calling themselves watchmakers and jewellers employ middlemen or "sweaters," who contract at so much per dozen for the repairs of watches, and who employ men who have learned their trade where no watches ever were or could be made. All this is very depressing, but there is no one particularly to blame; and although many young men are anxious to get a near cut to fame and fortune, there are many others who would be glad to spend some of their spare time in improving themselves if they knew the proper course to pursue.

I will then begin with the subject of tools. The old adage of the bad workman never finding good tools also implied that the bad workman expected too much from his tools; and while it would be difficult to exaggerate the assistance that the best of workmen may derive from good and appropriate tools, there can be no greater fallacy than to believe that tools, however good, will be of much use to a bad or unskilful workman or will enable him to do his work well, especially if that work be watch jobbing. In the first place it requires skill and experience in any one to use a tool of any sort and to keep it in order. For instance, I have known men that could not turn a pivot the proper shape, because they had never learned to whet a graver properly; and now that short apprenticeships or no apprenticeships are so much the custom, young men depend too much upon modern appliances to enable them to do what practice and thought can alone accomplish. Consequently, our tool shops display a great variety of well made, and, many of them, costly tools more or less automatic, many of them very pretty and calculated to attract the attention of amateurs and possibly give them an interest in watchmaking: but, although they are all intended for the use of the watch jobber, the greater part of them would, I think, be entirely useless to the workman who knew his business. Granting the room necessary for the proper fixing of these universal lathes and the systematic arranging of the chucks, cutters, &c., to be forthcoming, the time required to make the changes necessary in the appliances for doing one piece of work to that of another, say from turning a piece of brass to making a steel staff, would give an expert workman with a roughed out and tempered piece of steel a good start, even supposing that by the aid of the lathe the work can be as well done.

A watch jobber, however, must have certain tools to do his work well, and these should be good ones. A mandrel with a slide rest is indispensable, and it will facilitate the work if there be meeting centres to it. A small lathe actuated either by the hand or foot is also a necessity; the former is of course the more portable. This lathe, or throw, should have at least a dozen chucks with wire (steel and brass) of different sizes fitted to the chucks. With this tool almost every part of a jobber's work can be facilitated,—staffs and arbors roughed out; brass stoppings to large holes made, turned to the requisite size outside and inside; fusee pieces and barrel arbors all but completed in a very short time, and a repair frequently required and seldom done well (that is, the repairing of an upper fusee pivot) easily and expeditiously performed, by fitting the lower part of the fusee arbor in a brass chuck tightly; the top pivot can then be turned if necessary and polished. One of the most important uses of this hand lathe is screw making; there are more good watches spoiled from jobbers trying to use screws that can be bought ready made, and that are quite unsuited to the uses to which they are put, than from almost any other cause; and the fallacy is in thinking that by using these screws time is saved (that is if the jobber can make a screw). I will presume that one has a good stock of screws, English and Swiss, and that almost any screw in the watch has become overturned: of course the hole will require to be retapped, the thread or pitch of your bought screws will certainly not be the same as that of your tap; but suppose you get over that by forcing it into the hole, the head of the screw has to be fitted to the sink. If the head be sunk, the head will be either too high or too low, the tap will not be the right length, and the time spent in shortening the screw and chucking it to fit the head to the sink or reducing the height of the head, will be quite as much as it would take any tolerable workman to make a screw that would be in all respects equal to the original. In the case of jewel screws the objections to using ready-made screws is even greater, as these screws are usually and of necessity placed so close to the sink from the hole and setting, that a screw even a shade larger than the original one would often burst the hole into the sink; and although the variety in the size of the taps of jewel screws is not so great as that of the other screws of the watch, it is often necessary to make a jewel screw when the hole is already so large that it will scarcely bear to be tapped again.

The ways in which a lathe may be of use to a watch jobber cannot, in an article of this sort, be all enumerated. Anything that can be drilled in a lathe can be done so much more quickly and much truer than if the piece operated upon is held in the fingers or in a hand vice; and cement chucks may be made of almost any form for holding small pieces that cannot be gripped in the dogs of the mandrel, while at the same time this hand lathe is inexpensive and portable.

A depthing tool is also an indispensable tool to a watch jobber, and it should be the best that can be made. There are many of these tools made and sold that are worse than useless, as, if the distances between the centres do not coincide at each successive point at which they may be moved outwards, it will be impossible to pitch a depth correctly with them: in other words, the centres or runners should be parallel to each other, whatever the size of the wheel and pinion may be that is being adjusted in them. But, however correct the tool may be, it requires practice and skill to use it properly, as, when the wheel and pinion are removed from the tool, and the depth has to be transferred to the plate, if the depthing tool is not held at a right angle to the plate, but is inclined either to the right or the left, the depth will be either deeper or shallower than it was seen to be while in the tool. Care should also be taken not to screw the nuts up too tight, as it is quite possible to spring the runner a little from the way in which it is gripped; in fact a watchmaker should not be a strong man, otherwise he will make many difficulties for himself in this way.

Some men encumber themselves with a great variety of useless or worn out tools, pliers for instance, of which two or three pairs are quite sufficient. A watch jobber should never use hardened-toothed pliers, they spoil the work and are not necessary; a pair of long-nosed pliers softened with a good joint, filed up occasionally, and small at the points, will be almost constantly in use; they are much more reliable than tweezers for all such work as picking up pins, or for many other purposes for which tweezers are commonly used. A greater variety of tweezers are necessary, as those with long thin points, that must be used for such work as putting on a chain, or getting the pivots into the holes when putting a repeater together, should only be used for some such purpose, as the limbs are so weak that a pin is held in them with difficulty. Very good tweezers are now being sold, made light and stiff by giving the middle part of each leg the form of the segment of a tube.

(To be continued.)

Trade Mark Conference of the Paris Manufacturers.

THE general meeting, which was convened by the Paris and other French manufacturers for the purpose of establishing a national French trade mark, was held in the hall of the American Café, Place de la République, on the 6th ulto., and was largely attended. M. Lourdelet, who presided, proposed the formation of a large Syndicate of French manufacturers, forming a Society, the subscriptions to which would enable them to prosecute counterfeiters of the national mark adopted. He proposed that the meeting should pass some resolutions in this sense and submit them to public opinion.

M. Péan, President of the Union of Jewellers, suggested that the subscription to the Society should not be so high as to prevent the smaller manufacturers from joining the Syndicate, as they form the class more largely interested in this question. After recapitulating the legislative measures concerning trade marks, he proposed the adoption of a unique trade mark of the form of a triangle, containing the words "Article Français." Entering into questions of detail relative to the functions of the contract to intervene between members of the Society and the Syndicate, and examining the measures which could be taken against the counterfeiters, he then laid down in principle that the trade should have the power to protect itself. He ended by saying he did not wish to war against foreign productions, but wished them to be sold as such—"The press will aid us, but it is not in the power of the public to lead the way, it is for us to trace it."

M. Donzel, who followed, felt that there was something to say for making the foreigner respect the French mark, but thought that if they wished to proceed in order they should commence by prohibiting foreign-made goods from being marked in France. He said: "The International Convention of 1883 legalised and organised the imitation of the French marks in permitting a French manufacturer to put his trade mark on foreign goods in order to help him to sell them as of French manufacture."

After some remarks from other speakers the meeting voted the following resolution:— "A body of French manufacturers, met in general assembly, approve the creation of a national mark for the purpose of protecting products of French manufacture, and invite the Syndical Chambers to name a delegate in order to form a committee of vulgarisation."

Electric Clocks.

By J. Stephen.

(Continued from page 7.)

WE have described in some detail Bain's electrically-driven clock; partly because it is interesting as having been the first of its kind, and partly because an understanding of it helps to the understanding of others. Let us briefly run over what we found to be the essentials of Bain's system. We find that it belongs to the third of Lord Grimthorpe's classes. In the ordinary clock, it is the clock that moves the pendulum; in Bain's, it is the pendulum that moves the clock. This mover of the clock, the pendulum, though of course swinging by gravity, has nevertheless the requisite power for maintaining its movements against friction and the resistance of the air supplied by the galvanic battery, instead of by the winding up of a weight or spring. We find that the bob of Bain's pendulum is composed of a hollow reel of wire, placed in a certain relation to two steel permanent magnets, as shown in fig. 1. We have not seen, but it may well be imagined, and as a matter of fact it was the case, that Bain sometimes formed the pendulum bob of a magnet placed in relation to two fixed hollow coils or solenoids. Except for structural reasons, it is quite a matter of indifference whether the magnet be moveable and the coils fixed, or the converse. We have seen that the hollow coil has the two terminals of the wire with which it is wound running along the pendulum rod to the two springs by which the pendulum is hung, and that these two springs are connected or connectable to the poles of the battery. One of the springs is always connected, the other by a bridge closed or opened according as the pendulum moves the kneed slide to one side or another. When the pendulum has moved in such position as to close the bridge, the current descends one of the wires of the pendulum, traverses the coil forming the bob, and exits by the other wire. Thus an impulse is, under ordinary circumstances, periodically given to the pendulum. If the pendulum attains too great amplitude, the motive power is cut off by an action analagous to that of the centrifugal balance on the throttle-valve of a steam engine.

We have not yet seen how the motion of the pendulum gives motion to the hands of the clock, nor shall we consider this at present; we shall merely state that what, in an ordinary clock, is the escapement, becomes, in Bain's and homologous clocks, a propelment. Bain's pendulums, as we have yet considered them, get an impulse at each alternate semi-oscillation, but he devised means by which they should receive impulses at each semi-oscillation. He managed this by means of a commutator. When the pendulum travelled to one side, the coil forming the bob was traversed during part of its excursion by a current in one direction; when its direction of moving was reversed, the commutator also reversed the direction of the current transmitted through the coil. Bain's idea throughout seemed to be this: to give to his pendulum at each or each alternate oscillation, as the case may be, a slight "fillip," so as to keep it going against the opposition of friction. When the pendulum should have attained by cumulative impulses too great amplitude of oscillation, his idea was to automatically cut off the supply of electricity in a manner as we have already seen analogous to that employed in steam engines.

In the only other electrically-driven clock of any importance, that of Hipp, of Geneva, the converse plan is employed. The pendulum is allowed to swing by gravity, and it is only when its amplitude of oscillation becomes small that it gets the "fillip" that gives it a fresh impulse.

It may seem, on first thoughts, that here there is a distinction without much difference, but this is not so. In Bain's case the exception is when the current is broken, in Hipp's case it is the exception when the current is closed.

The defect in Bain's and all electrically-driven clocks seems not to lie in the earth battery of Bain (where most writers have found the difficulty), nor in the slide arrangement interfering with the period of the pendulum (where others have found it), but in the fact that the oscillation of the pendulum is "forced oscillation," and that the "forcings" are unequal. In Bain's arrangement, the mere fact that he found it necessary to arrange that the cumulative effects upon his pendulum required to be provided for, shows that the motive power was not proportioned to its work. Were there just sufficient power employed to do the work, that is at each oscillation to overcome the friction, then there could be no cumulative effect, and each excursion of the pendulum would be the same if the friction were, as it ought to be, always the same. If a source of electricity of a constant kind were substituted for the ordinary batteries, and the circuit and weight of the pendulum properly arranged, it would probably be found that a Bain's pendulum would oscillate with absolute isochronism, and that the time of the clock it propelled would be excellent. It may seem, then, that we also find the defect in the battery; and this is true in one sense, but as a rule the defect has been pointed out to be the failure of the battery to supply the minimum current required, whereas we find the defect not there so much as in the battery supplying *more* than the minimum current necessary.

We do not think that there is any insuperable difficulty in the way of arranging Bain's pendulums so that the sources of failure should be eliminated; but a discussion of such arrangements will better come towards the end of these articles than now.

(To be continued.)

Results of Experiments on the Vibrations of Pendulums with different Suspending Springs.

By W. J. Frodsham, F.R.S.

THE experiments of which I am about to give an account, and from which I propose to draw some practical conclusions, were undertaken with a view to determine whether some particular condition of the suspending spring of the pendulum, with respect either to its length, its strength, or both, might not cause it, with a lighter maintaining power, to produce a given arc of vibration, or, with a given maintaining power, to produce a greater arc of vibration than any other; and at the same time to ascertain whether some practical means might not be devised for making unequal arcs of vibration in the ordinary pendulum correspond to equal intervals of time.

My attention was drawn to the subject many years ago, when, having replaced the spring of a turret-clock by a stronger one, I found the arc of vibration materially altered.

Having often reflected upon the subject, I at length resolved to make some experiments to satisfy my mind respecting it; and I accordingly had made for the purpose a lenticular pendulum bob of about fourteen pounds weight, a cylindrical rod passing through it, with a nut working on a screw at the lower end and supporting the bob. The upper end of the rod was slit to receive the spring; and the spring and the rod were attached to each other by a pin passing through a hole in both.

But before fixing the pin, what I call an *isochronal piece* was slid over the top of the rod; and if this part of the apparatus had served only to attach the rod and spring more firmly together and prevent any wavering motion of the pendulum, it would have rendered an important service. This, however, was but a secondary and incidental effect of its application. The piece which I have so named is a brass tube about five inches long, fitting the pendulum rod very nicely, and slit to form a spring from about an inch at the bottom, so as to slide rather stiffly on the rod. At the upper end of the tube is a *clip*, which is made to embrace the suspending spring firmly by means of two screws; so that, after the pendulum has been brought to the proper length by the adjusting nut at the lower end of the rod, the length of the acting part of the suspending spring may be varied at pleasure, without in the least altering the length of the pendulum, by merely sliding the isochronal piece up or down the rod and tightening the screws of the *clip*.

I also provided five springs of different degrees of strength, and a silken string by which, in the first experiments, the pendulum was suspended. The pendulum used was an uncompensated one, but in each experiment it was adjusted to nearly the proper length for mean time.

Commencing with the silken thread, or, rather, two parallel threads, one behind the other, I suspended the pendulum within the case of a clock perfectly detached from the works, no maintaining power being applied.

Each degree of the scale on which the arcs of vibration were noted was nearly ·8 of an inch in length, and a degree was subdivided into twenty equal parts.

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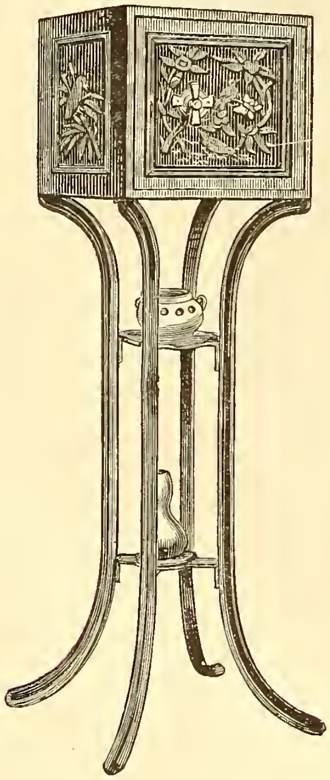

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I drew the bob aside 2°, and leaving it to vibrate by its own gravity, I found the arc of vibration was reduced from 2° to 1°, and from 1° to ½°, in the times noted as under :

Arc of vibration from 2° to 1° in 20*m.* 15*s.*
Do. do. 1 to ½ in 23 6

On repeating the experiment, the results were :

Arc of vibration from 2° to 1° in 21*m.* 0*s.*
Do. do. 1 to ½ in 24 0

Drawing the pendulum aside 1°, I found from five successive trials that the arc of vibration was reduced to half-a-degree in the times following :

From 1° to ½° in 21*m.* 45*s.*
Do. do. in 22 45
Do. do. in 22 0
Do. do. in 22 30
Do. do. in 23 0

Mean ... 22*m.* 24*s.*

The mean of the two preceding corresponding results is 23*m.* 12*s.* The difference may be satisfactorily accounted for by the difficulty of setting off the pendulum at the precise point intended, and of noting the time when the arc is diminished to the proposed quantity.

It is apparent from these experiments that when a pendulum is freely suspended, and left to vibrate from its own gravity, the arc of vibration is sooner reduced from 2° to 1° than from 1° to ½°, as might indeed be anticipated from the increased resistance experienced by the bob while moving through a greater space in the same time.

I attached the pendulum, suspended as before, to a clock with a maintaining power of 6 lbs. 8 ozs., but the clock stopped in 39 minutes, and setting it off again, it stopped in 43 minutes ; but on applying a weight of 6 lbs. 11 ozs. the clock continued to go ; thus showing that a weight of 6 lbs. 11 ozs. was sufficient to keep the pendulum in vibration, while one only 3 ozs. lighter was not.

The arcs of vibration in the preceding experiments being smaller than is desirable in practice, I proceeded to experiment with heavier weights, the pendulum being still suspended by the parallel silken threads, noting in each case the arc of vibration and the *rate* of the clock, viz., its gain or loss in 24 hours.

In the following experiments each succeeding pair is to be considered as giving the results for two consecutive days, though more than one day occasionally elapsed between the times at which the sets were taken.

Weight.	Arc of Vibration.	Rate.
14 lbs. 6 ozs.	2° 3′	— 9·0*s.*
8 0	1 30	+ 0·7
14 6	2 3	—10·0
8 0	1 30	0·0
11 2 1	1 45	— 7·0
8 0	1 30	+ 1·0
= 19 0	2 15	—13·0

It hence appears that when a pendulum is suspended by a flexible string, a heavier weight and a consequent greater arc of vibration causes the clock to lose.

The following are the dimensions of the springs which were experimented with :

Number.	Breadth.	Thickness.
1	·350 inch	·001 inch
2	·390 „	·002 „
3	·395 „	·003 „
4	·395 „	·004 „
5	·400 „	·005 „

The pendulum being suspended by the weakest spring, No. 1, the times were noted as before, in which the arcs of vibration were reduced from 2° to 1° and from 1° to ½°, no maintaining power being applied.

Arc reduced from 2° to 1° in 1*h.* 58*m.*
Do. do. in 1 57
Do. 1° to ½° in 2 8
Do. do. in 2 10

With the same spring, and a maintaining power of 4 lbs. 1 oz. and 2 lbs. 2 ozs., the following arcs of vibration and rate of the clock resulted from two successive days, the effective length of the spring being ·92 inch.

Weight.	Arc.	Rate.
4 lbs. 1 oz.	2° 3′	—9·6*s.*
2 2	1 30	—6·1

The pendulum being suspended with spring No. 2 and clipped at ·92 inch, without maintaining power, the arcs of vibration were reduced as follows :

From 2° to 1° in 2*h.* 20*m.* 0*s.*
Do. 2 to 1 in 2 20 44
Do. 1 to ½ in 2 26 0
Do. 1 to ½ in 2 26 0

Applying 4 lbs. 1 oz. and 2 lbs. 2 ozs. in succession, as a maintaining power, I found as under :

Weight.	Arc.	Rate.
4 lbs. 1 oz.	2° 9′	—0·2*s.*
2 2	1 36	+ 2·5

With spring No. 3 and effective length ·92 inch the following results were obtained on two consecutive days :

Weight.	Arc.	Rate.
4 lbs. 1 oz.	2° 15′	—2·5*s.*
2 2	1 39	—2·8

Reducing the effective length of the spring to ·80 inch, the following results were obtained on two consecutive days :

Weight.	Arc.	Rate.
4 lbs. 1 oz.	2° 9′	0·0*s.*
2 2	1 30	0·0
4 1	2 9	—0·5
2 2	1 30	—0·2
4 1	2 9	—0·2

Hence, with either of these lengths of this spring, the rate does not appear to be perceptibly influenced by the extent of the arcs of vibration. In fact, the vibrations of the pendulum may, for all practical purposes, be considered as isochronous.

The effective length of the spring was then increased to ·92 inch, and the following results were noted, without maintaining power :

Arc reduced from 2° to 1° in 2*h.* 26*m.* 0*s.*
Do. 2 to 1 in 2 25 45
Do. 1 to ½ in 2 37 0
Do. 1 to 0 in 2 36 40

On three other occasions, with the same spring and effective length ·92 inch, the following comparative results were obtained :

Weight.	Arc.	Rate.
4 lbs. 1 oz.	2° 15′	—4·0*s.*
2 2	1 39	—4·2
4 1	2 15	—5·0
2 2	1 39	—5·2
4 1	2 15	—5·0
4 1	2 15	—5·0

Showing that even with different lengths of this spring the vibration of the pendulum may be considered as isochronous with considerably different arcs of vibration ; and also, that with this spring a greater arc of vibration is produced with the same maintaining power than with any other spring that has been tried.

Spring No. 4 was next applied without maintaining power. With it the arc of vibration was reduced from

2° to 1° in 1*h.* 47*m.*
Do. in 1 48
Do. in 1 50
1° to ½° in 1 54
Do. in 1 55
Do. in 1 58
Do. in 2 0

Applying maintaining power of 4 lbs. 1 oz. and 2 lbs. 2 ozs. respectively with ·97 inch effective length of the spring, the following results were noted :

Weight.	Arc.	Rate.
4 lbs. 1 oz.	2° 6′	—2·5*s.*
2 2	1 30	+ 1·2

Even with this comparatively stiff spring the arc of vibration is greater with a maintaining power of 4 lbs. 1 oz. than it was with 14 lbs. 6 ozs., when the pendulum was suspended by two parallel silk threads. But the rate appears to vary more with the arc of vibration than it did when No. 3 was used.

Reducing the length of this spring to ·66 inch, the following results were obtained :

Weight.	Arc.	Rate.
4 lbs. 1 oz.	2° 3′	—14·1s.
2 2	1 27	—11·5

Sliding up the isochronal piece still further, till the length of the effective part of the spring was reduced to ·50 inch, the following were the results :

Weight.	Arc.	Rate.
4 lbs. 1 oz.	2° 3′	—18·0s.
2 2	1 12	—14·5

This further shortening of the spring appears to have had a perceptible effect on the arc of vibration when the lighter weight was applied.

I, lastly, attached the strongest spring, No. 5, and with effective length 1·0 inch :

Weight.	Rate.
4 lbs. 13 ozs.	—15·5s.
2 10	—13·5

Reducing the length of this spring to ·8, the following results were obtained :

Weight.	Rate.
6 lbs. 3 ozs.	—14·6s.
2 10	—12·4

Sliding up the isochronal piece still further till the length of the effective part of the spring was reduced to ·50, the following were the results :

Weight.	Rate.
4 lbs. 13 ozs.	—12·0s.
2 10	— 8·2

The lighter weight, 2 lbs. 2 ozs., employed in experimenting with the weaker springs, was found insufficient to keep the pendulum in vibration with No. 5 ; 2 lbs. 10 ozs. was found adequate to the purpose, and it was therefore employed.

In experimenting with this spring the arcs of vibration were not noted, as I found that both it and No. 4 were too strong for the weight of the bob I was using ; and to which the experiments indicate that No. 3 was excellently adapted.

The arc of vibration with the spring No. 3 (viz. 2° 15′), using a weight of 4 lbs. 1 oz., required 19 lbs. weight to produce it when the pendulum was suspended by the silken threads.

It appears, then, from the preceding experiments on suspending springs differing in length and strength, that there is one which, with a given maintaining power, produces a greater arc of vibration than others, and gives the same arc of vibration with a smaller maintaining power ; and further, that with this same spring the vibrations may, in point of time, be all considered as isochronous whether the arcs are large or small ; and with the aid of the isochronal piece, a spring of the proper length and thickness may easily be selected in a very few trials.

It may be noticed, too, that unless the pendulum is first *isochronized* by some such method as that which has been pointed out, anomalies may be imputed to *imperfect compensation* which have their origin in a very different source.

In fine it may be stated, in conclusion, that if the pendulums of astronomical clocks were furnished with what I have called an isochronal piece, any person possessing a few springs of different degrees of strength may, with very little difficulty, determine what spring is best adapted to the weight of the pendulum, and also which part of the spring may be most advantageously employed in action. I shall not think that the attention which I have given to this subject has been misspent if anything that I have done may contribute to the advancement of an art to which I have been professionally devoted during the whole of my life.

According to a pamphlet published by the Administrative Council of the Bendigo School of Mines and Industries, in connection with the Colonial and Indian Exhibition, the total yield of the Victoria goldfields since their discovery has been over 53,000,000 ounces, valued at £215,036,812.

The New Coinage.

THE *Daily News* says :—" No one quite knows why there is to be a new coinage, or, perhaps, only one person. The most probable reason is the all-sufficient one—*La Reyne le veult.* In the highest spheres, as in the lowest, there is sometimes a love of change for its own sake. Why not ? It is all a matter of fashion ; and if a lady may order a new bonnet at will, she may surely order a new head on a coin, when that head happens to be her own. In fact, it is almost a question of headdress. The Queen does not wish to circulate any longer the youthful portrait with which we are all familiar. The new head is to be a portrait to date. Yet, if that were all, it may be observed, we have already on the florin a portrait of the Queen in middle age. Yes, but the florin—not to put it as a coinage pun very much debased—is all crown. The big crown went out of Royal favour with the big bonnet. Her Majesty is understood not to like this heavy headgear of State, and it will have been observed that whenever, on recent occasions, she has worn a crown, its reduced dimensions have made it little more than a mere ornament for the hair. The crown, in short, has followed the lead of the bonnet, and nothing could more conclusively show where, in our day, the real supremacy resides. In the very highest circles, evidently, the idea of a love of a crown is something small, and the ponderous structure under the glass case in the Tower is as antiquated as the beaver bonnets of the beginning of the reign. Uneasy lies the head that wears a crown fitting it like a hat ; and, as the best middle aged portrait on the coin does wear one, there must be a new portrait done. The Queen knows that coins and medals endure beyond most things ; and, both as a Sovereign and as a woman, she cannot afford to be indifferent to the work of the engravers. In the museum at the Mint there is a proof medal, marked for correction with the Royal hand holding the Royal quill. The tiny spot of ink on the bronze has been religiously preserved ; and bronze and blot will probably go down to eternity together.

It is yet too early to say in what way the new head will be engraved. Mr. Boehm will only model the design for it on a large medallion scale. It will then, as we have shown, have to be copied on steel for the die. Will Mr. Boehm know how to manage the exceedingly delicate relief, which is an art in itself ? It is no easy matter to get all the characteristic modelling of a head in a relief scarcely rising above the surface of the coin. Coin engravers have always regarded this as one of the mysteries of their art ; and it will hardly do to say that, because Mr. Boehm is an eminent sculptor, he is sure to succeed in it. His design may need to be adapted to the uses of coinage ; and who is to adapt it ? Mr. Leonard Wyon, the present engraver to the Mint, may be willing to do this or he may not. It involves a delicate question of *amour propre.* One author would hardly like to be employed as reader of another's proofs. When Pistrucci worked for the Mint he always doggedly refused to engrave from any model but his own. His greater rival, William Wyon, did not stand so much upon his dignity : and he consented to work after his friend Chantrey on the two heads of George IV. and William IV.—the very finest in our coinage. The Chantrey head won the approbation of the King. It made him look like a gentleman, his Majesty said, while an earlier effort of Pistrucci made him look like a butcher. Both these heads were cut with the graver, as indeed were all designs on coins, down to a very recent date. The die engraving machine had not been invented. Now all that has to be done is to place an electrotype of the large model in one part of a rather complex machine, a piece of steel in another, set the machine in motion, and in a short time the die is done to any scale of reduction required. The saving of time is prodigious, especially in medal work. Some dies of elaborate design used to take months to engrave by hand ; the machine does them in weeks, if not in days. The gain in precision of rendering is also very great ; the machine reproduces the very character of the original, almost the marks of the modelling tool. This the

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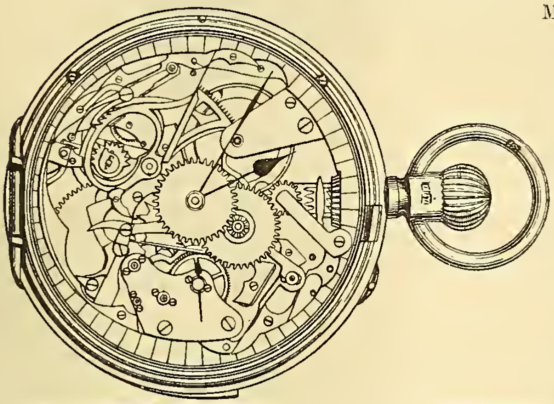

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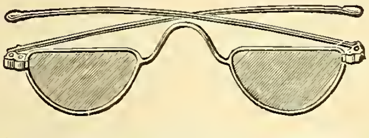

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graver never did. The hand work was always a mere translation; the machine work is a positive transfer to scale. It is one of the very few instances in art in which a mechanical process is superior to a hand process. One machine has been brought to great perfection, and nearly all our best medallic work in England is now done by it. The design is modelled by the sculptor; the transfer to steel is made by the machine, the engraver merely revising it as a finishing hand. This has completely altered the character of medallic work; each medal is now a miniature bas-relief, with its bronze "fresh from the clay" in its softness and freedom of touch. The medals of the latter part of the Queen's reign might almost dispense with dates. They will be dated, as to the epoch at least, for collectors who know how to look at them by their mode of handling. It will be the same with the Jubilee coins, if the machine should be employed for this new head.

The reverse, the side opposed to that of the head, or principal composition, is rarely worked from the machine, because the precise geometrical nature of the design does not admit of it. It is cut from a drawing, and here the patient men with the graver—those sculptors of the infinitely little—get their chance again. With a tubular magnifying-glass, fixed like a huge goggle in the eye, they will hang for weeks over their small block of steel, carefully picking it out, piece by piece, to form the shields and charges and crowns in which coin devices abound. Their average lion measures hardly a sixteenth of an inch from the snout to the tail, yet they miss no essential point of him in muscles and claws, and slim loin, and the great ear tuft of the mane. A lion running into an eighth or a quarter of an inch is considered pretty big game. One day we shall have the reverse of the half-sovereign magnified at some new Polytechnic, and then there will be no more magnifying of drops of water to show the hidden wonders of animal life. The jewels on the bands of the crowns are but specks to the naked eye, but only look through the goggle and you will make out lozenge and diamond and oval and all appropriate diversities of shape. The lines that serve as the arbitrary signs of heraldry for the colours of the shield must run as true in their parallels as railway tracks, though they sometimes count a hundred to the half-inch. The patience of the Pyramid builders was really as nothing to this; and they had their reward in working on a scale that ensured publicity for the achievement. A very few square inches of metal surface contain the die engraver's record for the year; and a modest little cabinet of flat drawers, not much larger than a hat-box, will sum him up for a long and busy life. In some of the larger cabinets a single drawer will suffice. You ask for the famous Smith's legacy to posterity, and, for answer, the collector pulls out one flat tray filled with tiny discs of bronze, whereon the vanished Smith, with the most gallant strivings, has spent the best forces of his artistic soul. His only advantage in the race for immortality is in his staying power. These things will still survive in their integrity when all the other art of the day is fine dust."

The Action of Oil on Metals.

MR. J. J. REDWOOD, having made a number of lengthened experiments, principally with a view to determine the oils best adapted for mixing with mineral oils for lubricating purposes, has published the results obtained, a *résumé* of which will be useful to horologists, with whom the action of different oils on metals is a subject of paramount importance. The metals were first thoroughly cleaned, washed with ether and dried, and, after being weighed, placed in cork tubes together with 15 c.c. of the oil, the tubes being kept for twelve months at an average temperature of about 80° Fahrenheit in the summer, and at 50° to 55° Fahrenheit in the winter.

The results show that:—

Iron is least affected by seal oil and most by tallow oil.

Brass is not affected by rape oil, least by seal oil and most by olive oil.

Tin is not affected by rape oil, least by olive oil and most by cotton seed oil.

Lead is least affected by olive oil and most by whale oil; but whale, lard and sperm oils all act to very nearly the same extent on lead.

Zinc seems, by the four actual weighings that were of any value, to be not acted on by mineral lubricating oils, least by lard oil and most by sperm oil.

Copper is not affected by mineral lubricating oil, least by sperm oil and most by tallow oil.

Mineral lubricating oil has no action on zinc and copper, acts least on brass and most on lead.

Olive oil acts least on tin and most on copper.

Rape oil has no action on brass and tin, acts least on iron and most on copper.

Tallow oil acts least on tin and most on copper.

Lard oil acts least on zinc and most on copper.

Cotton seed oil acts least on lead and most on tin.

Sperm oil acts least on brass and most on zinc.

Whale oil has no action on tin, acts least on brass and most on lead.

Seal oil acts least on brass and most on copper.

Mineral lubricating oil has, therefore, on the whole, the least action on the metals experimented with, and sperm oil the most. For lubricating the journals of heavy machinery, such as turret clocks, either rape or sperm oil is the best oil to use in admixture with mineral oil, as they have the least effect on brass and iron, which two metals generally constitute the bearing surfaces.

The History and Object of Jewellery.

By John Jones, F.R.G.S., &c.

JEWELLERY derives its name from the Hindoostanee "jouhur," a gem, and is of Oriental origin. Jewels are the insignia of rank; the types of all the good sentiments that agitate human nature; the embodiment of every form of beauty that adorns the visible creation. Their use is as ancient a custom as any on record. The greatest of the earth have employed them; the wisest found pleasure in them; and the savage shows, in his admiration of them, a lingering connection with a former civilization, proving how deep a hold they have on human feelings. According to the character of the people is the purpose for which jewellery is used.

In the early era of the world distinction of rank chiefly occupied attention. Wealth is generally the reward of superior moral or intellectual endowments; to its possessor is therefore transferred the respect which such qualities naturally command. Wealth thus forms one of the steps to exalted rank, with its envied privileges and powers. Jewellery has always been the symbol of wealth, conferring on its wearer general homage. The costliness of its materials was one cause of its selection; and the earlier nations were content with such influence as the rudest fashioning could convey. Some knowledge of metallurgy and mechanical skill must have been required in its simplest application, by which the value must have been increased greatly when such attainments were rare. Bracelets of ten shekels weight, and a nose jewel, or earring (as our translation has it), of half a shekel, or nearly half an ounce, is the description given of Jacob's present to Rachel. The mention of the weight implies that in the value of the materials consisted the chief value of the gift.

The improving ability of the artist introduced his labours into a new field of demand. Among a people whose literature was embodied in hieroglyphics, in which the prevailing characters of animals were made the symbols of corresponding ideas, it is not surprising that the symbol quickly usurped the reverence due to the idea, when it is known that the operations of nature were ill understood, and the mixed results of unchanging laws were attributed to the caprice of particular divinities. The forms of birds, beasts, fishes and insects became objects of devotion; and their presence on the person of the worshipper, even when laid in the tomb, was considered essential to his safety and comfort in this world and the next. Obedient to this religious demand, the jeweller became a student of nature's forms, thus laying the foundations of that beautiful structure of art in its various departments, in which a source of pleasure is provided more healthful than the indulgence of the senses—such, in short, as befits the temple of the imagination. The precepts of wisdom were accounted worthy of perpetual meditation; and the most enduring substances were used on which to inscribe mottoes, to be worn as the amulets of life.

In the Egyptian Room of the British Museum are mummies with scarabæi, or beetles, cut in stone, sown on their coverings. The cases also contain ornaments in gold-and-blue earthenware, to be worn as necklaces, representing birds, fishes and plants, the human eye or ear, hand or foot—emblems of spiritual principles or charms against evils.

The strict rules which the Egyptian priesthood enforced on all who practised the imitative art repressed the growth of improvement. Plato records that no artist was allowed to invent a new subject—a resolve which was fortunately delayed till considerable eminence had been attained, else the grandeur of Thebes had never astonished the world. Mr. Wilkinson, in his *Egypt*, has suggested that the priests were the sole artists; if so, we can better explain the objection to innovation, since among them reverence for antiquity and enforcement of religious ideas was likely to prevail over the fascinations of form. The jewels of Egypt, though primarily used as symbols of spiritual ideas, possess considerable precision of form. Blue earthenware, probably worn by the common people, was, as has been said, formed into necklaces, rings and bracelets. The richer classes used gold, sometimes struck up into small figures, with an economy of material rivalling the skill of Birmingham, sometimes inlaid with turquoise, lapis lazuli, coral, or such like soft products; the outlines of the design being formed by the gold collets enclosing the stones, these being, according to their colour, tastefully disposed, giving the first idea of mosaic work. Massive ornaments of gold were probably in vogue, for the Israelites must have possessed a large supply when they cast the golden calf; and the gold overlaying the ark has been computed at £156,118 value, probably obtained from no other source than the spoil of the Egyptians; but the intrinsic value of this manufacture generally hinders it from becoming the object of the antiquary's devotion.

The drawings of Ramesis II., from Beitonally, in Nubia, represent him wearing bracelets and armlets formed of plates of gold, about three inches long and one inch wide, strung on a blue web. To omit mention of their works in stone would be to neglect their chief excellence. Flowers of the lotus, sphinxes, birds, &c., cut in cornelian, amethyst sard and jasper, strung as necklaces, with globular or cylindrical beads intervening, as in Roman Catholic rosaries, attest a very high excellence in the lapidary's art. The sphinx, being the compound of human intelligence and the lion's strength, was the emblem of royalty: it is presumed that its use was limited to the royal jewels. Lions' heads were objects of honour, for the flood of the Nile was at the full when the sun was in Leo. In the use of lions' heads as waterspouts, we retain the Egyptian custom, however little of the idea remains. The signs of the zodiac, referring to the agricultural events of the year, formed a collection of popular symbols. A star would suggest astronomical movements, and is the leading idea in the formation of almost all flowers. Cowley calls them "stars of the earth." Precious stones were generally disposed into stars. If ornamental form for its own sake were at all admired, it was chiefly in geometric figures—a taste cultivated by the physical necessities of the country. Yet, even here, the symbolic association was not forgotten: the square for strength; the circle for eternity; and so forth.

The mystic repose of Egypt awed without subduing the livelier characters of their pupils, and, in some respects, their colonists, the Greeks.

Unsettled by the successes of King David, some of the inhabitants of Sidon, headed by Cadmus, migrated to Greece, carrying with them the knowledge of letters and the artistic skill for which they were famous. As early as Job the rotary motion of the earth is likened to the process of taking a cast from the ancient cylindrical seal. There are specimens in the Museum of some found in the ruins of Babylon, by which we may judge of the state of art among the early Arabians. Homer refers the manufacture of a prize cup of incomparable elegance to the Sidonians.

The traffic existing between Phœnicia and Egypt prompted Orpheus to visit Greece, and transplant there those refinements of civilization then flourishing at Thebes. To such sources may we trace the majestic current of Greek art. Athenian vanity, indeed, revolted against transmitted favours, and denied that "its blood was kindred with the nations of the earth." The ladies of Athens wore golden grasshoppers in their hair, to denote their being (as those insects were fabled to be) born from the ground, while their monuments and the roots of their language showed their intimate connection with Eastern nations. A fine climate and the infusion of adventurous spirits gave energy to the people. Aristotle pronounces imitation of nature to be the essence of the kindred arts of poetry, painting and sculpture; and with no less than a perfect imitation was their active temperament satisfied till the divinity of form reached their apprehension and numbered them as its devoted idolators. Men of genius made known the laws by which beauty exists, and the studios of Greece revelled in their power over human emotions. Their statuary in the museums, and their numerous engravings on gems in the public and private cabinets of Europe, give some idea of the industry of a nation of whom it was said that their images outnumbered their people. With a religion that embodied in human forms the attributes of the Deity, the expression of passion in the human face was a devotional study, and the public eye became trained to a quick perception of the character told in each feature. The ignorant excesses by which the Egyptians and Arabians disfigured their faces were avoided.

Arvieux, sent by Louis XIV. to gain information about the customs of the Arabs, relates that it is a piece of gallantry among the natives to kiss their wives through the rings hanging from their nostrils, which are sometimes large enough to admit the whole mouth. We can easily imagine with what disgust such unnatural distension of the nostril would affect us in this country. The ladies of modern times have happily abated the corresponding barbarism of piercing their ears. By confining jewels within their proper limits the objections of those who judge rather from the abuse than use would be removed, and a more healthful demand encouraged. Every feature of the face was felt by the Greeks to possess a peculiar grace: the forehead, eyebrows, eyes, nose, cheeks, lips and ears were blended together into a divine presence, which it were profanation to disturb by any foreign addition. Chaplets of flowers around the head are frequently mentioned by Anacreon as accessories, but the pearly necklace in his most lavish encomiums is alone permitted even to approach the sanctuary of beauty. Tutored by such models, simplicity and fitness were more esteemed than dazzling confusion of ornament. The undulation of water, which has given its name to the line of beauty termed cyma; the architectural ogee; the spiral, which from its frequency among shells may be regarded as an elementary form of nature; the honeysuckle and the ivy were their most frequent decorative forms, all distinguished by simplicity.

The pomp of the acanthus was a foreign importation, and has been pronounced on respectable authority, viz., Evelyn's, to have been borrowed from Solomon's temple; though applied with exquisite refinement, it does not seem to agree with the severe judgment of the people so well as the simpler forms. Jewellery was with them a microscopic sculpture; their setting of gems was not successful, because little used, but their deities in miniature, modelled in gold, surprise as well as please by their excellence.

(To be continued.)

The July number of the *Journal Suisse d'Horlogerie* contains the first paper of an interesting notice on the Mechanical Manufacture of Horology, by M. Ed. Sordet, Director of the School of Horology of Geneva.

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Old Scottish Communion Plate.

THE craft of the goldsmith and silversmith is one which has had an honourable standing in Scotland for hundreds of years. Even in the earlier days of which there are recorded facts concerning it, the work of the craftsmen had much to commend it—stimulated and improved as it was, no doubt, by the introduction of skilled workmen from France, with which Scotland then had no inconsiderable connection. When we think of early Edinburgh jewellers, the name that rises to one's lips is that of George Heriot. We see him in his shop, under the shadow of St. Giles', receiving King James; and we can bring the line down through honest burghers and traders, with their unpretentious places of business in the High Street, the Lawnmarket, or the Luckenbooths, to the time when an exodus of the silversmiths and jewellers took place into the North Bridge, before their final removal into the palatial establishments which most of those exhibiting now possess in Princes Street or George Street. It is very interesting to know that two or three of our jewellers and silversmiths of the present day are the descendants in the fourth and fifth generation of the craftsmen who flourished in the end of the last century and beginning of the present in the High Street; and, as a genuine relic of old Edinburgh, not a few will survey with interest the huge knife and fork which formed part of the sign of Marshall & Sons, goldsmiths to the Queen, over their shop in the old Luckenbooths. Upon the work of the Scottish silversmiths for the last three hundred years, at least, there are two exhibits which throw not a little light. While interesting in that respect to the craftsmen, they are at the same time of great antiquarian value, and from that point of view appeal to the sympathies of a wide circle of visitors. These are, first, the splendid collection of old Scottish communion and baptismal plate, dating from 1533 to the year 1800, gathered together from all parts of Scotland; and the insignia of the Royal Company of Archers, which also goes back for three hundred years. Both, along with many other very interesting articles, are displayed on the stand (623, in the Grand Hall) of Marshall & Sons, 87, George Street, Edinburgh. The communion cups form a unique exhibit. It would appear that part of them were recently shown at a meeting of the Society of Antiquaries, by Professor Macpherson, who read a paper upon them. Since then the collection has been greatly added to by the Messrs. Marshall, and is now shown, by permission of the kirk-sessions to whom the various articles belong, for the first time in public. They may conveniently be divided into three classes—(1) pre-Reformation cups, (2) cups manufactured from 1560 to 1630, and (3) cups from 1700 to 1800. The pre-Reformation cups are very few in number. Doubtless they were accounted among the "accursed things" which reforming zeal would single out for destruction. The oldest cup belongs to St. Mary's College, St. Andrews. It has a very small bowl, in shape like a champagne glass, mounted on a tall slender stem. It was made in 1533, and was presented to the Theological Faculty of St. Andrews in 1628, by William Guild, of Aberdeen. Under the same category are four silver gilt cups from Perth. One of them—which is not of an ecclesiastical pattern—is said to have been made by Benvenuto Cellini, and to have been given by the Pope to Queen Mary, who presented it to the Church at Perth. It owes its existence at the present time to its having been hidden in a grave during the troublous times of 1558. Of the cups of the second period, several retain the shape of the ordinary Mass chalice—including Carstairs, 1618; Dalmellington, 1633 and 1650. These were evidently made under the influence of the "Articles of Perth," when the Episcopal influence was strong in high places. But for the most part the earlier Reformation cups are of large size—as a protest, no doubt, against the withholding of the "cup of blessing" from the laity. It is rather a curious circumstance, however, that the form adopted for these cups was that of the Roman Catholic ciborium (the vessel for holding the wafer) without the cover; and this type of vessel continued to be made for more than a hundred years, or down to 1704, when it was abandoned, no doubt on account of its unsuitableness for drinking out of. Of this pattern are the cups of St. Mary's College, St. Andrews, 1567 (made of elm root, silver mounted); Beith, 1628; Dunfermline, 1626; Inveresk, 1632; Trinity College, Edinburgh, 1633; Canongate, Edinburgh, 1643; Tolbooth, Edinburgh, 1642; Old Greyfriars', 1633; and a number of others, including Wemyss, Dunblane, St. Andrews and Newbattle—the last-mentioned of which were used by Bishop Leighton. The cups of this period appear to have been presented principally by magistrates and heritors, and a few by noblemen in the different parishes. Many bear quaint inscriptions and quotations from Scripture. On the St. Cuthbert's cup (1619) is inscribed—"For the Wast Kirke outwithe Edinburghe. I will tak the coup of salvation and call upon the name of the Lord." The Canongate cup (1644) bears this inscription—"Gifted to the Kirke of the Canongate by Margaret Herring. He hath washed us from our sins in his owen blood." One of the St. Andrew cups (1569) carries the Scriptural injunction—"Bot let a man examine himself, and so let him eat of this bread and drink of this cup;" on another—"James Carstairs and Christian Bryden his Spous gifted thir cups for the church service of St. Andrews, *ad usuam et exemption*, 1671. I am the Vyn, ye are the brainches. The cup of blissing which we bliss, is it not the communion of the bluid of Crist?" while on the Kilwinning cup (1677) is the inscription—"Communion cups, given for the perochiners of Kiloinining. Be wise as serpents; harmless as doves." The cups from 1700 to 1800 are, with one or two exceptions, made of silver. Two from Premnay, near Insch, Aberdeenshire, are of horn, and were in use down to 1726. They are in form of ordinary drinking cups, and possibly indicate the poverty of the parish. One of the cups, of date 1700, was the property of the French Protestant Church (Huguenot refugees) in Edinburgh, and was given by their last representative, in 1818, to Trinity College Church.

In the way of general remark it may be said that during the days of the Puritans and Covenanters the cups were made of a simple pattern. Those of Biggar (1650), St. Vigeans (1667), and Birnie, are of the form of plain silver tumblers. The others have the moulded stem and goblet-shaped bowl, and in their size resemble the cups still made and used in Presbyterian churches in Scotland. The stems of some of the earliest specimens of the eighteenth century are of very fine workmanship. Most of the cups are of Edinburgh manufacture. Their dates have been ascertained by the marks of the makers and the deacons of the craft which they bear. The date letter was not introduced into the Edinburgh Hall till the close of the seventeenth century. Aberdeen also produced some excellent work, and one cup made for Craig parish, near Montrose, in 1682, is well engraved and embossed. In 1633, when King Charles attempted to conform the ritual of the Scottish Church to that of the English, some cups were procured from London, such as those of Trinity College, Edinburgh. Two cups of very handsome design, of London manufacture, come from Duirinish, in Skye. They were purchased in 1612 by Macleod of Macleod—Rory O'More—who at that time visited King James in London. It was seeing the Duirinish cups at Dunvegan that led Professor Macpherson to turn his attention to this most interesting subject of inquiry. A cup which comes from Æthsting in Shetland bears the Dantzig mark. There is also a collection of old baptismal basons and lavers (1633 to 1700), from the Canongate, Trinity College, Old Greyfriars, Tron, Edinburgh, Newbattle, and St. Andrews parishes. Many of them are wonderful specimens of the silversmith's art, hammered out of the skellet before rollers were known. The laver and bason belonging to St. Andrews, Fife, were presented to that church by Archbishop Sharp, who was murdered on Magus Moor in 1679. The laver belonging to Trinity College weighs 70 ounces, and the flagon 80 ounces. The former, which is of very fine hammered work, bears the following inscription:—"This basine was maide for the north east pariche of Edinburgh, and that at the charges and by the charitie of some honest induellers of the same, anno 1633." In the centre is a kneeling figure at an altar, "the honest induellers" who made the gift having evidently had Episcopal leanings.

It may be that the visitor who seeks only to gratify artistic taste will find but little in this collection of old sacramental cups to detain him, though some of them are of graceful form and finely membered; but there are others in whose eyes these sacred vessels of the Christian faith, ungainly as many of them are, will assume a value as they gaze upon them, which would be no greater if they were made of the purest gold and in the highest style of the craftsman's art. For do they not carry the mind back to the time when there was but one King and one Church in Scotland; and are they not silent but eloquent witnesses to the struggles maintained for freedom during the sixteenth and seventeenth centuries, of which none can speak but with feelings of emotion and pride? May not Knox himself have used the St. Andrews cup when he was in that city? and not less dear to the sentiment of others is the one associated with the name of the sainted Leighton. To how many communions on hillside or moor—such as the late Sir George Harvey has so graphically depicted—may not some of these old vessels have been carried, and how many of those who drank from them may afterwards have "sealed their testimony with their blood?" Messrs. Marshall & Sons certainly deserve all thanks for having brought together this most interesting collection, which we may be allowed to suggest should certainly be photographed and "keyed" before being dispersed. The collection numbers in all ninety-three cups, from seventy-two different parishes of Scotland.—*Scotsman.*

The Indian Gold and Silver Plate Industries.

On Saturday, the 24th ulto., at a Conference of the East India Association, held at the Colonial and Indian Exhibition, a paper was read on the above subject by W. Martin Wood, Esq., the chair being taken by Sir George Birdwood, C.S.I., M.D. The lecturer said that the Indian gold and silver plate industries, in common with similar industries at home, were in a very depressed state, and from the same cause—oppressive taxation. Every variety of the gold and silver wares of India are to be seen in the Exhibition, arranged, by the highest experts, in their proper places, according to the locality from whence they have been sent, or to their various characteristics. The tea and coffee services, the cruets, salvers and wine goblets of Kutch and Kattiawar are practical examples of what the industry and skill of those parts might do for themselves and for homes of luxury and taste in this country, were it not for the vexatious fiscal and customs regulations—which the speaker stigmatized as "the two-handed engine behind our door"—which had stifled the natural trade demand for Indian productions of this kind. The East India Association had made every effort to get these imposts removed and to remedy the "pernicious meddling" of a trade Guild—the Goldsmiths' Company. He went on to say that it was not only the Indian producers that were to be considered in this matter, but that, in demanding the liberation of the plate industry, the British gold and silver plate manufacturers were equally interested: at present this latter industry was being crushed. In 1885, duty was paid on nearly 1,000,000 ounces of silver plate, but in 1885–86, only 690,300 ounces were assessed, and the decline in the export trade had been in even greater proportion. With regard to the effect the customs duties had on the Indian trade, there were virtually no statistics for comparison, as the export trade was virtually extinct; and whereas in 1883–84, 30,300 rupees' worth of plate was exported from India, the value had diminished, in 1885–86, to something less than 12,000 rupees, and in March last 285 rupees represented the value exported.

Mr. Wood stated, in respect to the question as to the present low price of silver and its operation on the subject, that when silver was 5s. per ounce it was considered that the 1s. 6d. duty with its concomitants was equivalent to a tax of 30 per cent.; but now that the price of silver was reduced to 3s. 8d. per ounce, it must be equal to nearly 50 per cent., while the electro-plate manufacture, on the other hand, was perfectly free. As one of the consequences, that interest attracted enormous capital to itself, while it did not pay one penny to the customs officer or exciseman. Thus there was, on the one hand, all the power which the mechanical contrivances of the West and modern metallurgic chemistry could confer, aided by unlimited capital and perfect division of labour, and, on the other hand, slow, patient labour of individual artisans without capital, handicapped by prohibitive fiscal and obstructive regulations, which did no good to anyone, save perhaps to a few capitalist goldsmiths, who tenaciously clung to the protective interest arising from the interest of rebate and drawback.

Messrs. Watherston and C. Wood and Surgeon-Major Pringle took part in the discussion which ensued in sympathy with the views of Mr. Martin Wood; and the Chairman, in moving a vote of thanks to the last named for his paper, said he thought the duty would be removed in the course of time, but thought the hall mark was another thing, as it helped to protect designs. Mr. Watherston seconded the vote of thanks, and the meeting concluded.

Burman Gold and Silver Smithing.

The Burmese are adepts at artistic work in metal. Their gold work consists chiefly of female trinkets, the best being a kind of necklace called *bayet*, composed of several strings or chains of filigree work joined together, with little figures in red gold of the mythical *henza*, or sacred goose. The best silversmith's work is seen in large bowls, embossed in high relief with fanciful designs. The plain cup or bowl, having been shaped, is filled with a resinous composition, in the centre of which is inserted a wooden pin, so that when the resin cools, the cup is fixed as on a lathe, the pin forming a handle. The workman then with a graver and hammer slightly marks out the pattern, which he delineates by sinking the surrounding metal into the yielding matrix.

A little *niello* work is executed on the same principles as the lacquered boxes. The pattern is made in silver slightly embossed, and the whole is coated with black varnish or enamel. The lathe is used to take the varnish off the raised ground, leaving the silver pattern in a black setting.

The smelting of silver for producing the currency of the country is carried on in the following manner. Silver, purchased from the Kakhyens (who procure it from the Chinese) to the amount of six *ticals* (say 3⅙ ozs.) is mixed with 1½ *ticals* (378 grains) of copper wire, and the two metals are melted together, the smelter adding sufficient lead (judging the weight) to make up the total weight to ten *ticals* (5½ ozs.). The smelting is conducted in little saucers of sun-dried clay, placed on a bedding of paddy husk to make them lie evenly; charcoal is heaped up over them in hollow pyramids, which being ignited, the bellows are vigorously applied. As soon as the metals fuse, little pieces of lead are put in, according to the judgment of the smelter. When the mass is at a red heat, the charcoal is removed, and if a piece of wood, which is now held over the alloy, freely ignites, a round, flat, brick button, about the size of a five shilling piece, on which a smooth layer of moist clay has been spread, is laid on the surface of the molten mass, two men previously blowing upon it through bamboo tubes. The brick disc does not cover the whole of the alloy, and the surplus metal round the edge forms a thick ring, to which lead is freely added to bring the mass up to the proper size and weight. As it solidifies, there forms a white disc of silver surrounded by a thick, dark brownish ring, containing metal of the same purity as the disc, but covered with a coating of refuse and lead. The mass is removed from the saucer before it is perfectly hard, and the brick disc falls off, leaving the coating of moist clay adhering to the silver, which is then cleaned, and a number of round spots are dotted with cutch on the face of the alloy, to make the mass look pretty. It is then weighed and is ready for cutting up. The saucers in which the alloy is melted are sold at 80 rupees (£8) per 1,000 to the lead smelters, who extract any silver and lead that may remain; and the refuse of this smelting is sold to the potters, who use it as a glaze for tiles, while it appears to be sometimes also employed in *niello* work.—*Journal of the Society of Arts.*

AMERICAN WALTHAM WATCH COMPANY.

◆ ◆ ◆

We beg to call the attention of the Trade to our New Price List, dated July 1st, 1886, which will be sent post free on application accompanied with business card.

We believe the market offers nothing of any other make to at all compare with the goods we offer in such a combination of quality and price.

These goods, bearing the name of the Company, are sold upon their merits, which, we believe, will be more evident and acceptable to dealers and to the public than the fictitious value often claimed for goods of less established repute than Waltham.

ROBBINS & APPLETON,
GENERAL AGENTS.

Waltham Buildings,
Holborn Circus, London, E.C.
July 1st, 1886.

RICHARD & CO.,
French Clock Manufacturers.
LONDON:
24, CANNON STREET, E.C.
PARIS:
Boulevard St. Martin, 32, Rue de Bondy.

THE LARGEST STOCK OF
CARRIAGE and FRENCH CLOCKS (own make).
CARRIAGE CLOCKS (own make) PATENTED.
Vide Horological Journal, July, 1881.

Rewarded at the following Exhibitions:—
PARIS, 1878. SYDNEY, 1879. MELBOURNE, 1880.

STEAM LAPIDARY WORKS.

FORD & WRIGHT,
Diamond Cutters and Polishers.

Gem Cutters and Lapidaries in all Branches.

DIAMOND MILLS, CLERKENWELL ROAD,
AND
18 & 19, CLERKENWELL GREEN,
LONDON.

All Diamonds and Gems cut on the premises.

GEORGE ORAM & SON,
WHOLESALE AND EXPORT
Chronometer, Watch and Clock Manufacturers,

Marine and Pocket Chronometers, and all kinds of Printing Chronographs, Keyless, Duplex, Independent, Dead Beat and all kinds of Centre Seconds and First-Class Lever Watches, Regulators, &c.

18 & 19, WILMINGTON SQUARE, W.C.

WATCHES FOR THE BLIND.

JOHN GREENWOOD & SONS,

34, Farringdon Road, London,
(ESTABLISHED 1839)

MANUFACTURERS & IMPORTERS
OF

AMERICAN, FRENCH,
ENGLISH AND GERMAN
CLOCKS.

Artistic,
Old Style,
AND General Printers.

Hutchings & Crowsley
Limited,

35 to 41, HENRY STREET,
St. John's Wood, N.W.,
AND
123, FULHAM ROAD, S.W.

EFFECTIVE DESIGNS Prepared,
and
Suitable Blocks Engraved,
by
Experienced Artists.

General Notes.

At the Annual General Meeting of the American Jewellers' Guild, recently held in Chicago, it was resolved to support the efforts being made in another direction for the foundation of a Horological School.

An Industrial Exhibition of motors and machine tools, tools and models for small industries, was opened at Stockholm, on the 12th ulto. The Exhibition will be kept open until the 12th proximo. It includes the following groups:—1. Motors for small industries. 2. Machine tools for wood, stone and metal. 3. Machines for textile fabrics, leather, skins, paper, &c., with auxiliary machines and appliances. 4. Machines and apparatus of small size for the production and application of electricity. Only small machines are admitted, objects requiring more than 21½ square feet of ground space only being admitted exceptionally. No charge is made for space; and applications are to be made to the Utstallnings Komiterade, Stockholm, Handtverks föreningenshus, Sweden.

Jewel Frauds.—The *Pall Mall Gazette* says:—"There is consternation just now in the Palais Royal, and the jewellers of Paris have found themselves the dupes of what has not yet been pronounced to be a fraud. Last year they were the victims of a diamond fraud. The gems found at the Cape were more plentiful and of inferior quality to the genuine diamond of fifty years ago. The fire was less brilliant, and the stones had a yellow tinge. An ingenious manipulator steeped them in a violet dye, and by some chemical process they came from the ordeal a pure and brilliant white. This industrious investigator received as the reward of his research a recompense of six months' imprisonment, and the Palais Royal jewellers were for the moment comforted. But now things are going wrong again. There are some splendid rubies in the market, whose genesis it is very difficult to account for. Tested chemically, they answer the true definition of the Oriental ruby; analysis shows them to consist of all its constituents—and nothing else. The chemist is satisfied, but the expert has his doubts. The fire is not so brilliant, and there are certain yellow tones which the true gem has escaped. It is suspected that a difficult problem has been solved, especially since it is found that these gems when broken up do not follow a regular line of cleavage—as a crystal should—but split in all directions. It is suspected that Swiss artificers have learned how to melt a number of small rubies and consolidate them into one. Ten carats weight of ruby sparks would be worth about ten shillings. One ruby of ten carats would be worth some hundreds of pounds. The subject is a serious one, and there are both chemical and legal difficulties in its treatment. Experts are now employed to ascertain how the thing is done, and then the judges will decide whether the process or sale amounts to fraud."

The golden rose presented by the Pope to Queen Christina of Spain, as the reward of her virtues, is a beautiful work of art. It consists of a pure gold branch, bearing nine full-blown roses, a number of buds and some hundred exquisitely chased leaves, while the centre rose is made longer than the others, to contain the musk and balm of Peru placed there ceremonially by the Pope. The rose branch stands in a silver-gilt vase of the sixteenth century, ornamented with a figure of St. Christina and an inscription recording the gift. Two tiny angels form the handles.

The latest story about the Rev. Henry Ward Beecher, who is at present in this country, tells what came of his losing a watch through the skill of a pickpocket. The incident was widely circulated by the newspapers and naturally afforded material for journalistic wit without end or bounds. But the sequel was very consoling to Mr. Beecher. A day or two after his loss he purchased a low-priced watch for immediate use. The next day the president of a well-known watch company sent him a watch, with the compliments of the manufacturer; a few days later a friend surprised Mr. Beecher with a present of a very handsome watch of the best make; then the city of Boston, by way of recognising the services rendered in the address which he lately gave in that city on General Grant, sent on a watch of beautiful finish and workmanship; and, finally, the stolen watch itself was returned in exchange for a reward. Mr. Beecher is now anxious, it is said, to have something else stolen from him.—*European Mail.*

A new form of portable drinking cup has been brought out by Messrs. C. Timings & Son, of Birmingham, which should prove a boon to tourists, commercial travellers and others. The cups are formed of six rings, which telescope into one another and when closed fit into a metal case shaped like an ordinary watch case. The material of which they are made is nickel silver and aluminium, and the cases are finished to resemble gold or silver watches, some being plain, burnished, others engraved, engine turned, &c. They can be worn at one end of a double Albert chain, on which they form a more useful and ornamental counterpoise to the watch at the other end than the bunch of keys or whatnot usually carried.

The Great White Diamond, of which so much has lately been written and said, was submitted by Messrs. Ochs Brothers, of Hatton Garden, to the Queen a few days since. In cutting, it has fully realised the sanguine expectations which were formed of it, turning out a magnificent brilliant of the first water and of great brilliancy. It weighs in its present state 180 carats, is free from imperfections or flaws of any sort, and is said to surpass in quality and weight all the recorded historical diamonds. An idea of its value may be gathered from the fact, that a piece sliced off the end in shaping it was sold for £4,000 and weighed 19 carats after cutting.

Speaking of the ruby mines in Burmah, *Blackwood's Magazine* says:—"The principal diggings are about seventy miles to the north-east of Mandalay, and cover an area of a hundred square miles. Square pits are dug in the ground until the gravel bed is reached in which the gems occur, and from which they are extracted by a rough-and-ready mode of washing. The rubies are generally smaller, and commonly disfigured by flaws. The sapphires found are for the most part larger than the rubies, and are more perfect. The annual value of stones of all kinds taken from these mines is from £12,500 to £15,000. It is possible that the ignorance of miners is mainly accountable for the small returns, and that by the aid of European skill and machinery their yield might be vastly increased; but judging from the actual condition of the workings, their practical value falls far short of the expectations formed about it on the Paris Bourse."

The Diamond Market.—According to the latest reports, the condition of the diamond market remains practically unaltered. At Amsterdam there is little business being done, chiefly on account of the low prices which are offered by the few buyers present. At Paris there is no improvement, although there is some sale for diamond ornaments, which, however, exercise but little influence on the market owing to the large stocks on hand. The "Athenian," "Pembroke Castle" and "Mexican" arrived at Plymouth during the month, bringing considerable quantities of Cape stones, of which *Bultfontein* were in most demand, but the merchants were generally indisposed to speculate at the high prices which ruled. At Kimberley, local business is dull, but companies' parcels continue in demand at reduced prices.

The Oscar Gold Mining Company has been reconstructed under the title of the New Oscar, &c., Company, and the shares are issued at £1 each, with 15s. paid, leaving a liability of 5s.

Quicksilver.—The importer's price remains at £7 per bottle, second hands at £6 19s.

Silver.—The price of bar silver is $43\frac{13}{16}$d. per ounce, at which it has remained steady, excepting some slight indications of a rise, during the past month.

Chronometer Rating at Kew Observatory.

THE Kew Committee of the Royal Society have announced that they will undertake the rating of marine chronometers —granting certificates as in the watch trials—under the following conditions:—

1. The chronometers are to be delivered either at the Kew Observatory, Richmond; to the Secretary of the Horological Institute, Northampton Square, London, E.C.; or to Mr. R. Strachan, of the Meteorological Office, 116, Victoria Street, Westminster, S.W. All risks attendant on their transit to, and the safe custody at the places designated in this paragraph must be borne by the sender of the chronometers.

2. No certificate will be granted for a chronometer unless it bears a distinguishing number on its dial or movement. The maker's name need not be engraved.

3. Chronometers may be rated before they are fitted into their gimbals and boxes, provided they are numbered.

4. Every chronometer will be wound when it is received at the Observatory, and will be handled by trained observers only. If it should stop, the chronometer will be returned to the sender with an appropriate memorandum.

5. The chronometers are tested in sets, and the trials will begin early in October, December and subsequent alternate months. Instruments intended to be submitted to any one of such trials should be deposited either at the Observatory or at the receiving houses *at least three days before the date of its commencement, which may be learnt on application.*

6. The fee for rating and for issuing the certificate and table of rates for each chronometer is £1 1s. It will be payable on the notification that the certificate and table of rates are ready to be issued. The fee charged for a chronometer that fails to obtain a certificate, or breaks down during its trial, is half-a-guinea. This includes the charge for a statement of its performance whilst running.

7. Duplicate certificates and rate tables, with the customer's own name filled in, can be supplied to makers at a charge of 2s. 6d. each. The original certificates and tables must, however, be returned whenever an application is made for duplicates.

Details of Trials to which the Chronometers are submitted during Rating.

The trial occupies 35 days, divided into five periods of six days each, and five intermediate days, namely, one day at the commencement of each period of test:—

1st Period—Chronometer	at Temperature	of	55°	F. or	13°	Cent.
2nd ,,	,,	,,	70°	,,	21°	,,
3rd ,,	,,	,,	85°	,,	29°	,,
4th ,,	,,	,,	70°	,,	21°	,,
5th ,,	,,	,,	55°	,,	13°	,,

Certificates are granted to chronometers which have undergone 35 days' test, as specified above, and whose performance is such that—

1. The mean of the differences in each stage of the examinations between (*a*) the average daily rate during that period and (*b*) the several daily rates does not exceed two seconds in any one of the stages;

2. The mean daily rate has not been affected by change of temperature more than one-third of a second per 1° F., which is about one-half of a second per 1° Cent.;

3. The mean daily rate has not exceeded ten seconds in any stage of the test.

A Veteran.—Mr. William Apps French, of 5, King Street, Maidstone, writes to the *Daily News* of the 27th ulto.:—"Having for fifty years in succession paid my plate licence (£2 6s.) in my own name, and residing in the same house ever since April, 1823, I feel anxious to know whether any of your correspondents can inform me whether any other watchmaker and jeweller has exceeded the above time."

Technical Education.

THE following is the result of the City and Guilds of London Institute Technological Examination in Watch and Clock Making:—

Name.	Grade and Class.	
	Ordinary.	Honours.
Walker, George (Aberdeen)	—	1
Black, W. C. (Horological Institute, London)	1	—
Bolt, James Ditto ditto	2	—
Bonniksen, B. Ditto ditto Second Prize, £3 and Bronze Medal ...	1	—
Connell, F. R. (Horological Institute) Third Prize, £2 and Bronze Medal	1	—
Cooper, E. S. (Horological Institute)... ...	1	—
Dakin, H. Ditto	1	—
Davison, G. A. Ditto	1	—
Law, E. H. Ditto	2	—
Morris, G. V. Ditto	2	—
North, R. B. Ditto	1	—
Player, J. S. Ditto	1	—
Rogers, Tom Ditto	1	—
Wallace, E. Ditto	1	—
Williams, F. C. Ditto	2	—
Collins, C. E. (Polytechnic Institute) ...	1	—
Hasluck, P. N. Ditto ...	2	—
Höhr, Joseph Ditto ...	2	—
Kleyser, J. Ditto ...	—	2
Sanson Ditto First Prize, £3 and Silver Medal ...	1	—
Allis, F. C. (Bristol University College) ...	—	2
Allis, W. L. Ditto ...	1	—

Eighteen Candidates failed to pass.

Birmingham News.

From Our Correspondent.

THERE is a continuance of the depression under which the jewellery trade has laboured so long with few exceptions, factors and makers complaining of the difficulties they meet with in obtaining orders. I am unable to hold out any hopes of immediate improvement or increase in the demand for goods from the country; many are relying almost entirely upon their jobbing trade, which, fortunately, continues to increase as well as maintain its regularity. The demand for high-class work continues fair, and I hear of some of the best firms being fully occupied; one house, employing about seventy or eighty work-people, is so fortunate as to be able to work overtime, but this is exceptional. Silver jewellery decidedly maintains its position, and its manufacture steadily increases; the inflow of orders is remarkable for its regularity; silver being perhaps as low as it can come, enables makers to buy at good rates and offer their manufactures at a price which brings them within the reach of all classes.

* * *

Business in the watch trade is perhaps quieter than it was fifteen months ago, when it was considered at its lowest; the competition in this industry, for the few obtainable lines, is exceedingly keen, and prices which were in the history of the trade never so low now go begging. To the credit of the trade, in Birmingham, however, the quality remains equally as good as it did years ago, when from 10s. to £1 more than present quotations was freely given. The effects of this is more seriously felt in Coventry, and frequently discovers itself in inferior work, with which makers are flooding the market. This will prove most injurious to shopkeepers whose reputation depends upon the reliability of their goods, and who are unable to detect the seemingly genuine from the sound article; and I would strongly urge them to reject these *special* parcels, which I regret to learn are being offered, and to deal only with houses of established character.

* * *

In connection with the visit of the British Association to Birmingham in September, there will be in Bingley Hall an exhibit of the manufactures of Birmingham and the district of fifteen miles around. This exhibition will comprise, as far as possible, processes in operation. I am pleased to report that English machine watchmaking will be represented by the English Watch Company, Limited, who have arranged for a display of their finished goods, and also as complete an illustration as space will permit of the machine processes used in their large factory. This display is one that will be certain to attract many of your readers, whilst others will reap valuable information from the various exhibits of the jewellery trade, which will be very comprehensive and illustrate from one extreme to the other the present development of this industry. Amongst the processes in this branch will be diamond cutting by the firm of William Spencer & Son. I may mention that the interests of manufacturing jewellers will be in the experienced hands of John Bragg, Esq., who, with others, is officially arranging the Jewellery Section.

* * *

Birmingham Assay Office Report for the official year ending 24th June, 1886. This will be interesting to many readers, as it recapitulates the figures for the previous six years, and shows that, notwithstanding the depression of trade, their business continues to increase.

		1880.	1885.	1886.
Gold wares assayed and marked ...	ozs.	81,606	97,618	101,298
Gold wares assayed and broken ...	ozs.	1,861	1,052	916
Silver wares assayed and marked ...	ozs.	239,835	888,391	905,852
Silver wares assayed and broken ...	ozs.	2,249	3,161	2,976
Number of gold and silver wares entered for assaying	...	971,749	2,738,808	2,826,122
Number of assays made	...	57,760	121,901	115,553
Amount of plate duty collected ...	...	£13,898	£20,221	£19,808

* * *

Many people are doubtless unaware of the very moderate charges that are made for assaying and marking gold and silver wares, and I am pleased to be able to notify that still further reductions have been made in these charges. The present prices, which are announced as commencing on the 19th inst., are as follows :—

Gold.	s.	d.
Each Watch Chain ...	0	6
Each Double Albert or Guard...	1	0
Each Watch Case	0	6
For each Locket, Necklet, Pendant or Bracelet...	0	2
For each dozen Studs, Links or Rings ...	0	4
For other ware, each ...	0	1

Silver.	s.	d.
	Per	oz.
For wares weighing five ozs. each and upwards	0	0½
For Solid Table Spoons, Tea Spoons, Table Forks, Fish Carvers, of whatever weight ...	0	0½
Watch Cases and Pendants	0	1
Wares not included in the foregoing items ...	0	1
	Per	doz.
Wares not exceeding in weight 3 ozs. (except watch pendants) ...	0	3

Fractions of a penny in the accounts are charged a penny, and no parcel of gold or silver work will be charged less than 1s. The full weight of gold and silver will be returned without stoppage for diet; formerly, manufacturers trade charges were considerably increased by this unfair stoppage, but the practice being discontinued they will be able to balance their gold and silver accounts without reckoning the dead loss which diet occasioned them.

Trade Notes.

Perry & Co., Limited, Steel Pen Makers.—The Directors of this Company have resolved to pay on the 1st September, out of profits, an Interim Dividend on the Ordinary Shares for the first six months of this year, at the rate of 6 per cent. per annum, free of Income Tax, being at the same rate as for the corresponding period last year. The half-yearly Dividend on the Preference Shares will be paid as usual at the fixed rate of 5 per cent. per annum.

From the official return of rough and uncut diamonds exported from the division of Kimberley during the month of February, 1886, it appears that the weight in carats was 225,184¼, the declared value being £257,969 17s. 2d.

British Horological Institute.

The Half-Yearly General Meeting of the above Institution for the election of officers, &c., took place on the 22nd ulto., under the presidency of Mr. D. Glasgow, Vice-President.

The report for the half-year ending 30th June, 1886, stated that a better state of things existed than was submitted in the last report, which showed an empty exchequer; and that, mainly through the success of the *Journal*, the income during the half-year had sufficed to meet all expenses.

Owing to representations from members that English watchmakers suffer much injury from the sale of foreign watches made in exact imitation of English patterns, and fitted to cases bearing the English hall-mark, which allows unscrupulous persons to sell such watches as genuine English productions, the Council, in January, appointed a Committee to consider the subject, and, if possible, to devise a remedy. The Committee, after conferring with Mr. Prideaux, the Clerk of the Goldsmiths' Company, suggested that the trade generally should have an opportunity of discussing the matter; and accordingly a public meeting of the trade, to which Members of Parliament for watchmaking centres and others especially interested were invited, was held at the Institute, on Wednesday, 17th March. Resolutions were passed to the effect that Parliament should be asked to restrict the national hall-marks to goods of English make. The President of the Board of Trade expressed his willingness to include hall-marks in a comprehensive bill relating to trade marks, which he proposed to introduce, but the absorbing nature of the Irish question during the session, and the ultimate dissolution of Parliament, destroyed all hope of immediate legislation.

The Class Visiting Committee testify to the uniform and untiring efforts of the several teachers during the past year, and generally report that the results of the various classes may be considered satisfactory. In the practical classes the average number of attendances of the students from July, 1885, to July, 1886, has been twenty-eight. Mr. T. D. Wright, the lecturer, reports that the attendance of effective students to the theoretical classes has been very regular and satisfactory.

The balance sheet accompanying the report showed an income of £623 18s. 7d., giving a balance of £46 1s. 4d.

The following officers were elected :—*President:* The Right Hon. Lord Grimthorpe. *Vice-Presidents:* William Chapman, F.R.G.S.; David Glasgow; John Jones, F.R.G.S. *Treasurer:* Thomas Mercer.

As Members of the Council, twenty-nine were nominated, of whom the following were elected :—Richard Atkins, 31, Northampton Square, E.C.; Charles Bacon, 51, Gerrard Street, Islington; William Barnsdale, 18, Brunswick Place, City Road, E.C.; Thomas Baxter, 33 & 35, Goswell Road, E.C.; James Bray, 40, Cheapside, E.C.; Richard Bridgman, 84, Strand, W.C.; Daniel Buckney, 5, King Square, E.C.; Lewis Donne, 2, St. Michael's House, St. Michael's Alley, E.C.; Charles Dunn, 3, Upper Gloucester Street, Clerkenwell, E.C.; John Hammersley, 14, Barclay Road, Walham Green, S.W.; G. H. Harwood, 207, St. John Street, E.C.; James Haswell, 49 & 50, Spencer Street, E.C.; Thomas Hewitt, 4, Spencer Street, E.C.; H. P. Isaac, 10, Spencer Street, E.C.; Ami Jaccard, 26, Percival Street, E.C.; E. D. Johnson, F.R.A.S., 119, Highbury New Park, N.; A. A. Klaftenberger, 157, Regent Street, W.; Victor

Kullberg, 105, Liverpool Road, N.; James Oliver, 6, King Square, E.C.; Edward Perrett, 8, Victoria Chambers, Westminster, S.W.; Albert Roberts, 334, City Road, E.C.; Edward Rigg, M.A., 9, Royal Mint, E.; Richard Strachan, F.R.M.S., 11, Offord Road, N.; Julien Tripplin, 5, Bartlett's Buildings, E.C.; F. W. Troup, 36, Hatton Garden, E.C.; F. R. Warman, 31, Spencer Street, E.C.; A. W. Webb, 90, High Street, Islington, N.; T. J. Willis, 19, River Street, Myddelton Square, E.C.

APPLICATIONS FOR LETTERS PATENT.

The following List of Patents has been compiled especially for *The Watchmaker Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents of 323, High Holborn, London, and 6, Lord Street, Liverpool.

8,414. Edmund Shanley, 53, Armstrong Street, Peel Road, Bootle, near Liverpool, for "Making clocks run without attendance, to answer for spring or weight." Dated 26th June, 1886.

8,531. Francis Ignatius Ricarde, Seaver, a communication from Edward Caspar Kleiner-Fiertz, Switzerland, for "Improvements in and connected with the manufacture of aluminium and other light metals." Dated 29th June, 1886.

8,539. James Grieve Lorrain, Norfolk House, Norfolk Street, London. for "Improvements in self-winding clocks." Dated 29th June, 1886.

8,552. Henry Harris Lake, a communication from The New Haven Clock Company, Incorporated, United States, for "Improvements in clocks." (Complete specification.) Dated 29th June, 1886.

8,564. Gustavus Baron de Overbeck, a communication from Hector de Grousilliers, Germany, for "Improvements in the electrolytic production of aluminium." Dated 30th June, 1886.

8,678. Arthur Bonville Wilkins, 14 & 15, St. Swithin's Lane, London. for "Preserving watch keys from dust, named 'Wilkins' patent dust-proof watch key.'" Dated 2nd July, 1886.

8,683. Andrew William Agnew, 9, Mincing Lane, E.C., for "Improvement for connecting sleeve links." Dated 2nd July, 1886.

8,730 Philip Arthur Newton, a communication from Charles Auguste Paillard, Switzerland, for "Improvements in the manufacture of compensation balance wheels for watches and chronometers." (Complete specification.) Dated 3rd July, 1886.

8,751. James Grieve Lorrain, Norfolk House, Norfolk Street, London, for "Improvements in self-winding clocks." Dated 3rd July, 1886.

8,800 Albert William Foster and Leonard Oxford, 22, Pepper Street, Nantwich, for "The illumination of the face of instruments that indicate time." Dated 6th July, 1886.

8,882. Joseph Sharpe and John Howard, London, for "Improved apparatus applicable in the manufacture of cases for watches, lockets and analagous articles." Dated 7th July, 1886.

8,896. James Grieve Lorrain, Norfolk House, Norfolk Street, London, for "Improvements in self-winding clocks." Dated 7th July, 1886.

9,091. James Yate Johnson, a communication from Alfred Clodonier Lemaire, France, for "Improvements in solitaires or dress fastenings." Dated 12th July, 1886.

9,102. James Cassey and John Frederick Dixon, Birmingham, for "Improvements in electric clocks or time indicators." Dated 13th July, 1886.

9,163. Carl Emil Arnold De Jong, a communication from Otto Friedrich Christoph Baunier, Germany, for "An improved spring fastening for studs, neckties, gloves, purses, boxes and other articles." (Complete specification.) Dated 14th July, 1886.

9,189. Andrew Shallaway, 13, Woodley Street, Queen's Road, Harpurhey, Manchester, for "Improvements in connection with watch protectors." Dated 15th July, 1886.

9,193. William Beverley, Glasgow, for "A new or improved watch protector, which is also applicable for protecting other valuables." Dated 15th July, 1886.

9,235. Hugh A. Macfarlane, Isle of Bute, for "A pocket, watch and purse protector." Dated 16th July, 1886.

9,270. Auguste Goy-Golay, London, for "Improvements in watches with chronograph and repeating mechanism." (Complete specification.) Dated 16th July, 1886.

9,365. Henry Davey, London, "An improvement in escapements for clocks." (Complete specification.) Dated 19th July, 1886.

Correspondence.

All Letters for Publication to be addressed to the Editor *of the* Watchmaker, Jeweller and Silversmith, *Imperial Buildings, Ludgate Circus, E.C.*

THE "INVENTIONS" MYSTERIOUS AWARD.

Sir,—Your correspondent, "Horologist," in his letter in your last month's journal, is a little mixed in his statements and evidently ill-informed as to his facts.

Most of the exhibitors in the case of the Horological Institute were under the impression that by exhibiting in that case they would not be excluded from competing with other exhibitors who had obtained space for themselves.

When, however, it was known that this case was to be treated as one exhibit, and the individual exhibitors would not be recognised, the Jury Commission, on the recommendation of members of the jury, on the grounds of the great merit of many of the exhibits in this case, granted six copies of the Diploma of Honour to six out of a great many exhibitors. "Horologist" says the Jury Commission refused to adjudicate. The Jury Commission did not refuse as they were not asked to adjudicate; but they appointed a jury, who awarded six copies of the Diploma of Honour to the six exhibitors named in the announcement referred to. The whole matter is now ancient history, and I don't think "outsiders" are asking any questions concerning it. "One who knows."

22, Pimlico Road, S.W., *8th July*, 1886.

Sir,—You say you wish to make *The Watchmaker, Jeweller and Silversmith* a really good and useful work. If so, why allow Mr. Bickley to confuse men who have not learned to polish, by telling them they cannot polish steel with anything but bell-metal, when it is known by any boy finisher or escapement maker that tin or zinc is the only thing that will finish it, used after bell-metal.

This is about the only mistake in a well written article, but it is a fatal one. Fancy a jobber wanting to put a good black polish on a stud or index trying to do it with bell-metal.

I do not think you know how practical men sometimes laugh at what they read in technical journals. The worry these mistakes must give men who try to learn must be immense. With best wishes for the success of *The Watchmaker, Jeweller and Silversmith*, I am, yours obediently, H. J. Day.

[Mr. Day points out what he thinks is a "fatal mistake" in Mr. Bickley's paper on Watch Polishing in our last number. The supposed error occurs in the antepenultimate paragraph, wherein our contributor, in speaking of polishing with redstuff, says: "steel generally does not polish well with redstuff on anything softer than bell-metal." Mr. Day thinks this "confusing" to men who have not learned to polish, "when it is known to any finisher or escapement maker that tin or zinc is the only thing that will finish it, used after bell-metal." It seems that Mr. Day, in his anxiety to correct a mistake has fallen into one himself. "Fancy," he further says, "a jobber wanting to put a good black polish on a stud or index trying to do it with bell-metal." But studs and indexes, it may be observed, are not the only nor the most frequent things jobbers have to polish, judging from the condition in which they are generally seen on old watches. We should rather have thought that pieces made or completed in the turns came most in the jobber's way, and we sincerely hope that no jobber has "confused" himself and spoiled his work by attempting to polish his pinions or pivots with anything softer than bell-metal; and, even with studs and indexes—if he must use redstuff, which the article does not recommend—he will succeed much better with bell-metal than with soft tin. If Mr. Day doubts this, we recommend him to try it. But, disregarding particular instances, which the paper was not intended to meet, the sentence under discussion ends by stating that "zinc may sometimes be used." Where then is the mistake? Apparently in not recommending soft tin, a metal unsuited to the purpose in hand. Our correspondent, in short, appears to have misunderstood the drift of the article, which is essentially general and not special in its aim. We are nevertheless glad of this opportunity of directing further attention to an article of such practical value as the one in question, and thank Mr. Day for his good wishes for the success of *The Watchmaker, Jeweller and Silversmith*.—Ed.]

Answers to Correspondents.

W. L. B.—The paper on the Vibrations of Pendulums, of which you send us an imperfect copy, is by W. J. Frodsham, F.R.S.; it was read by him before the members of the Royal Society in 1838. We accept your suggestion and republish it from another copy, and have no doubt it will be of value to many of our readers.

The Watchmaker, Jeweller and Silversmith.

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The Watchmaker, Jeweller and Silversmith.

A Monthly Journal devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

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Editorial.

THE value of organisation and the corresponding disadvantages of the want of it, were perhaps never more forcibly illustrated than in the last effort made by a leading section of the English watch trade to get rid of the inconvenient anomalies (and the consequent fraudulent practices which it affords an opening for) of the law relating to the hall-marking of watch-cases.

The law as it at present stands compels the Goldsmiths' Company, or any other public assay office, to assay and stamp any cases (irrespective of their place of production) which may be sent to them that come up to the required standard of the metal ; as a consequence of which, foreigners, and notably the Swiss, largely avail themselves of the opportunity of getting their goods stamped with a mark which renders them more readily saleable in this and other markets than the guarantee mark of their own respective countries ; although, as far as regards the Swiss, this is no more than a custom, as the Swiss mark is quite as reliable as the English.

Now if this were all, all would be well ; the goods being sold on their merits, nobody would have any just ground of complaint, as the hall mark is not in any sense a trade mark, but is merely a guarantee that the metal of which the cases are composed is of a certain quality.

But of late years there has sprung up a disloyal competition of a very extensive character in Swiss watches, made on the English model, which, bearing the names of English watch-sellers, it is impossible for any but experts to distinguish from what they are represented by unscrupulous traders as being, viz., English-made watches.

The trades concerned have here evidently a plain case ; this misrepresentation—which the hall mark in the cases enables to be successfully carried out—is in itself a distinct fraud, from which both the watch trade and the public are entitled to protection. But the watchmakers, instead of combining in a rational manner to put a stop to an obvious grievance, used the opportunity to air pet theories of their own, all pulling in different directions; while the Members of Parliament who were invoked to their aid, none of whom probably thoroughly understood the question at issue, made use of it as a peg to hang their several hats on—one advocating protection absolute, and others measures more or less impracticable,—the result being that they were left in *statu quo*, with aggravated circumstances so far as the President of the Board of Trade was concerned; whereas, had the case been properly put before him, it would have been regarded in a different light to that of the thin edge of the wedge of "protection."

The Royal Commission on Trade Depression is about to officially report, if rumour says not falsely, that the general trade of the country is, on the whole, in a satisfactory condition, with the exception of certain industries which have deteriorated from various causes; and that wages are higher and the necessaries of life are relatively cheaper.

It is to be feared that watchmaking must be classed in this exceptional category, while it is undoubtedly the opinion of the great majority of the trade that the deterioration is largely due to the present system of foreign competition which the law allows.

The present would be a good opportunity for the watch manufacturers, who are neither a sufficiently numerous or influential body to act by themselves, for uniting with some other bodies, such as, for example, the Sheffield cutlers, who find themselves in the same condition with regard to unfair foreign competition, when, doubtlessly, a *modus vivendi* could be arranged which, avoiding the stumbling-block of "protection," would enable their parliamentary representatives to frame a short Act that would remedy the existing state of affairs.

Visiting the Drawing School established by the Goldsmiths' Company at 157, Goswell Road, the other day, we had a conversation with Mr. Meyer, the instructor, on the subject of technical instruction as applied to the goldsmiths and jeweller's arts. This gentleman, who is evidently an enthusiastic artist, took a great deal of pains to explain the course of teaching pursued by him, and showed us a number of specimens of the students' work, many being original designs of a very high order, the executors of which could undoubtedly make their mark in any branch of ornamental art. In the course of the interview, however, it transpired that Mr. Meyer is by no means satisfied with the amount of support he receives from the class of young men for whose benefit this institution exists, and this indifference he attributes, whether rightly or wrongly, to the demoralising effect of Saturday half-holidays and the counter-attractions of the usual metropolitan evening amusements.

However this may be of the few, we should be exceedingly sorry to think there were none among our young working-men having higher aspirations than such a belief would indicate, and take rather the view that, although they would generally be glad of such a course of instruction, they do not know where to obtain it.

A wider advertisement of the school, calling attention to the gratuitous instruction and giving particulars as to the nature of the subjects taught, would undoubtedly result in a larger attendance and a distinct benefit to the crafts concerned from an educational point of view.

Mechanical Drawing.

By Robert Marshall.

THE art of representing objects by means of lines on flat surfaces is almost as ancient as man himself. Such are the crude efforts to represent dogs, stags and other animals left on the surfaces of stones, &c., by the cave men of prehistoric times, likewise the hieroglyphics of the Egyptians and other ancient peoples. Writing itself is merely a development of the art whereby man is enabled to record facts and to communicate abstract ideas to his fellows.

Mechanical drawing, like the calculus and other aids of the mathematician, enlarges the powers of the mind, giving a concrete form to "mental presentations," and enabling the mind to more readily mature its conceptions. And, further, by its aid the artisan, without explanation or instruction other than a knowledge of its principles conveys, is enabled to construct mechanism, however complicated its details, in perfect unison with the ideas of the designer.

It would be useless further to enlarge upon a subject which properly belongs to the psychologist; therefore the scope of the present article will be briefly described as follows:—

First.—It is to present in a practical manner, to those desiring to acquire a knowledge of the art, suggestions that will enable them by a little application and study to become thoroughly expert in understanding, or, as it is technically termed, in reading drawings; and, secondly, to offer a few remarks on the material and instruments chiefly required, such as will only call for the assistance of a little perseverance and practice to convert the reader into a tolerable draughtsman.

In making a drawing it is essential that the draughtsman should start with a thorough predetermination of the effect he desires to produce. Practically speaking, objects may be divided into two classes, viz., *symmetrical* and *unsymmetrical*. By a symmetrical object is meant an object whose dimensions about axes intersecting at right angles are equal: such is a sphere and a cube. When an object belongs to the former class the observer only requires to view it from two positions at right angles to one another to get a perfect conception of its form; and it follows that in a drawing only two views are required to convey the impression of the exterior. These are generally supplemented in mechanical drawings by a third view, which shows the structure of the interior of the object. When, however, an object belongs to the second class and is not symmetrical, more views are required and the number of these depend upon the changes of form. The exterior representation of such objects involves projection or perspective; but for practical purposes these perspective views are dispensed with, as an additional section or two presents the structure quite as clearly to the mind. Where an object of this kind has to be dealt with, it should be remembered that the intention of the drawing is to convey an accurate idea of the object. The draughtsman, therefore, should consider how many different positions he requires to view it from in order to get an accurate conception of it. He should then, from each position thus determined, make a section of the object in a plane at right angles to the line of his vision. When a knowledge of perspective is acquired—which requires some proficiency in geometry—the number of sectional views necessary can be considerably reduced; but the adoption of the sectional mode must result in reliable working drawings or drawings for the workshop.

To enable the student to rapidly acquire an idea of form from sections, there is no better exercise than that of modelling objects in some soft substance, such as paraffin wax, and cutting them through in different directions. To be able to read drawings and to understand the principles on which the different views are laid down, enables the mechanic to work without further instruction, and by means of a piece of chalk and a convenient door to make sketches as valuable often as highly-finished drawings.

In laying down the drawing of a symmetrical object—one requiring only three views—decide first the size or scale of the drawing. Draw lightly in pencil a vertical line passing through the centre of the paper, then draw a horizontal line passing also through the centre of the paper. By the intersection of these two lines the paper will be divided into four equal areas. Into the upper left-hand division is laid down the first view or elevation, in the lower left-hand division is laid down the plan, and in the upper right-hand division, the section.

In drawing the elevation, the first step is to lay down the vertical centre line, and this must be produced through both the upper and lower left-hand divisions. The second step is to draw the horizontal centre line through the upper left-hand division, producing this line also through the upper right-hand division. The third step is to draw a horizontal centre line through the lower left-hand division, but this need not be drawn through the right-hand lower division unless an extra section or view is required. In mechanical drawing, objects are always constructed about centre lines. Thus, in the elevation or first view, given the extreme width, one half of this is taken and set out on each side of the vertical centre line; the same with the extreme height—one half of this is taken and set out on each side of the horizontal centre line. These remarks apply to all views. In the plan or second view, in the left-hand lower division the object is supposed to make a quarter of a turn on the horizontal centre line as an axis; this, it will be seen, would bring the upper surface of the object into the same position with reference to the eye of the observer as the surface previously shown in the elevation occupied. In the section or third view, in the upper right-hand corner the object is supposed to make a quarter of a turn on the vertical axis, and the surface here shown is that which would be exposed were the object cut through the vertical centre line in the *elevation* by a plane at right angles to the surface of the paper. From the foregoing remarks it will be easy for the student to deal with objects requiring several views, if he bear in mind that in laying down the several views the object is supposed to turn about the vertical axis always from left to right, and about the horizontal axis or centre line from top to bottom, whether it be by a quarter of a turn, half a turn, or a tenth of a turn. Thus an object in making a part turn about the vertical axis, finds the horizontal centre line still passing through its centre, and in making a part turn about the horizontal centre line, still finds the vertical centre line passing through its centre.

There are two classes of mechanical working drawings: the details, and the general arrangement. The detail for the construction of the various parts—the general arrangement for showing the relation of the parts when fitted together. In the detail drawings every part of the machine or structure is drawn separately, often full size and sometimes to a smaller scale, such as half size, quarter size and less. The dimensions of the object are clearly shown by figures whose reference is indicated by lines terminating in arrow heads, and the measurement from arrow head to arrow head is that indicated by the numerals. These dimensions are always put upon scale drawings, but are sometimes omitted in full size drawings, though it is not advisable to do so, as the absence of dimensions compels the workman to apply his rule to the drawing, which act, by virtue of his nearly-always dirty hand, soon soils the drawing and, frequently before the job is finished, the drawing becomes illegible. It is also advisable to always dimension drawings, be they full size or to any other scale, as this practice compels the draughtsman to check his work, and many errors are thus obviated. The scale to which the general arrangement is usually drawn of course depends upon the size of the machine or structure. Thus the general arrangements of small engines are often drawn "quarter size," whilst that large ones, such as marine engines of 1000 h.p. and upwards, are drawn to a scale of eighth size or inch-and-half to the foot, and sometimes less, there being no invariable practice, the object being to show the relation of the details to one another in the completed structure: and for this purpose such a scale is chosen as will show the various details clearly. The general arrangement drawings are often coloured and shaded, and are then known as finished drawings.

A Draughtsman's Materials.

A draughtsman's materials consist chiefly of the following articles:—Paper, pencils, ink, drawing board, T square, set squares, compasses (large), compasses (small) or bows, spring bows, drawing pens, dividers, parallel ruler, protractors, scales, drawing pins, indiarubber, tracing paper, tracing linen or cloth, water colour cakes, delf palates and paint brushes, a fine file and a penknife.

There is a great variety of paper, machine-made and hand-made, hand-made being *decidedly* the best and at the same time the dearest. Web drawing paper is cheap, and is much used; its great weakness, however, is its inability to stand much application of the indiarubber; it is soft, and the pencil readily makes deep lines in it, and in the act of erasure, though the indiarubber may have removed the black lead of the pencil mark, the groove or indentation still remains, and too vigorous an application of the rubber removes the surface of the paper in flakes. Some tough and thin cartridge papers behave better under the application of indiarubber, but it is also difficult here to remove the grooves formed by the point or edge of the pencil. Hand-made paper is vastly superior; it appears to possess an elasticity that prevents the formation of the pencil grooves (unless, of course, undue pressure be exerted on the pencil; and even under these circumstances a little clean water applied by a paint brush will often cause the paper to swell and resume its former condition). Furthermore, the hand-made paper is tough, and is not easily destroyed by the use of the indiarubber.

Pencils.

The pencils used in mechanical drawing are much harder than those used in freehand drawing. Faber's and Cohen's are very reliable; Nos. 4 and 5 Faber's, and H H H and H H H H Cohen's, are the most serviceable; No. 4 Faber's for large scale drawings, such as half inch to the foot and upwards, and No. 5 for smaller scales. Faber's pencils are usually hexagonal in section, a form which prevents them rolling off an inclined drawing board. A round pencil may be cured of this bad habit by cutting a flat side on it. In mechanical drawing, the lead point should be shaped like a chisel—chisel-edged, in fact—and not round as generally used in writing and in freehand drawing. This edge should, when drawing, be always kept sharp, and for this purpose a fine steel file or a strip of fine sand paper gummed on a flat stick should be kept close at hand. The latter device is economical and effective.

Ink.

Indian or Chinese is the ink chiefly used for the purposes of mechanical drawing. It is, perhaps, not generally known that the copying press and copying ink were invented by "James Watt" for the purpose of copying mechanical drawings; but the paper it is necessary to use to take a good copy is of too fragile a nature to stand the rough usage of a workshop. The copies now made for workshop use are always on stout tracing paper or tracing cloth, and the ink most suitable for this purpose is, undoubtedly, Indian or Chinese ink. A good deal of so-called Indian ink is manufactured in this country, and it varies much in quality. It is made in sticks of various sections, square, rectangular, hexagonal and octagonal. Neither the form nor the coloured and gilded Indian and Chinese characters with which these sticks of ink are adorned form any criterion of their quality, in fact the quality can only be known by trial. The best ink is hard when rubbed on the palate or saucer of delf ware in which some clean water has been provided, and should give a brown tint first to the water, deepening gradually to black; there should be no grit present, and when the wetted end of the stick of ink dries it should have a hard glossy surface, and should exhibit no cracks. Ink to be used for inking in drawings should be fresh each day, as the ink when old runs and smears when the colour is applied to the drawing.

THE DRAWING BOARD.

The drawing board is made in various sizes to suit the size of paper. It is usually made of common deal or red pine, wood sufficiently soft to allow drawing pins to be thrust in, and sufficiently elastic to close up the holes somewhat when the pins are withdrawn. The edges should be perfectly fair without indentations or irregularities and at right angles to one another. The wood should be well seasoned and the board should have two or more bars fixed on the back to prevent it warping.

FIXING PAPER.

The paper is fixed on the board in various ways. Sometimes it is merely pinned down at the four corners by drawing pins, more especially when it is not intended to ink in the drawing; but when the drawing is to be inked in and coloured, it is advisable to damp the paper by passing a wet sponge over the whole surface and then to apply glue all round the edges of the under surface and press it down. When the glue and the paper dries it shrinks and will be found tightly stretched upon the board; care must be taken to keep the paper moist until the glue at the edges dries, otherwise the shrinking strain will draw the edge and the paper will pucker. Instead of glue, strong paste may be used. There are special drawing boards constructed with a frame that is removeable. When the frame is removed and the paper is laid on the board, the paper overlaps the board all round. When the frame is pressed into its place it takes the paper down and holds it firmly. The edges of the frame become then the edges of the board.

T SQUARE.

There are three different forms of T squares. The T square in which the blade and stock are fixed and the T square with an additional shifting stock. The third form is a T square in one stock which is shifting. The stock is the upper part of the T, and when shifting, it shifts or rotates on a centre pin which is fitted in the fixed stock; the pin is fitted with a jamb nut to fix the stock in any desired position. The T square is made of various woods; the blade should be polished, as the open wood takes up dust and dirt which is not readily removed by a duster and soils the paper. The T square is the most convenient instrument for drawing parallel lines. It should always be kept true and its truth can always be tested by drawing a line and then turning the square over so as to bring the under side of the blade uppermost. If the square be true, on bringing the edge from which the line was first drawn up to the line, it will be found to be fair with the square in its new position.

Set squares are triangular in form and two of the sides are always at right angles to one another, whilst the other sides form in different set squares different angles; in some the angle is 45°, in others 60°, &c. They are used for drawing lines at right angles to the lines drawn with T squares. They, like the T squares, are made of various kinds of woods, sometimes they are solid, sometimes built; those made from the solid warp and curl up when in the sun, a defect from which the built set squares are free. Vulcanite is also used for making set squares; it is perhaps the cleanest material used for the purpose, as it does not soil the paper and dirt is easily removed from its surfaces.

DRAWING INSTRUMENTS.

The drawing instruments, such as compasses, bows, pens, dividers, &c., should be carefully selected. It is not well to choose compasses and bows too lightly made, as they are apt to spring whilst in use, especially in the hands of a beginner. Needle points are the best, and of these there is a variety; but the ordinary needle points alone will be noticed here, as there is no improvement of much consequence in them. The end or vice which holds the needle should not be too fine, as, otherwise, it tends to make a large centre hole in the paper. So great a defect was this in the case of the old instruments that centres of transparent horn were placed upon the paper to protect it. The end of the leg holding the needle should have sufficient surface to act as a stop or shoulder to prevent the needle entering the paper to a greater depth than its length from this shoulder to the point. Tracing paper is, of course, more easily destroyed than other material by clumsy use of the compasses, and great care should be taken when tracing to preserve the centre.

(To be continued.)

Redard's Tool for Comparing the Vibrations of Balances.

THIS is an improvement on the little machine which excited so much interest in the American Watch Company's stand at the Inventions Exhibition, 1885. It is constructed by M. Paul Grosjean-Redard, of Chaux-de-Fonds, and has been awarded several prizes at various recent exhibitions in Switzerland. It appears to be well adapted for the purpose for which it has been constructed, and, if generally adopted, would prove a great boon and saving in time to watch timers.

The following is a description of the various parts to which the letters refer:—A, stand of machine; B, cylinder fixed in the stand; C, platform pivoting round the cylinder B; D, junction of the platform; E, lever by means of which the platform is moved; F, screw round which the lever E pivots; G, plate on which are fixed the cock H and the barrel I; J, balance pivoted into the jewel-holes of the plate and cock; K, spring; L, glass of the frame or barrel; M, moveable column; N, cylindrical shaft, adjusted friction-tight in the column; O, middle spring actuating the shaft N; P, push-piece for fixing the shaft N; R, push-piece, by means of which the column is approached to or withdrawn from the centre of the platform; S, spring, which by pressure fixes the column on the platform; T, horizontal arm of the shaft N; U, central arbor; V, nut by which we can turn the central arbor; X, small wheel; Y, arbor spring of the small wheel; Z, lever actuating the arbor spring; A', cannon carrying the arbors; B', binding-nut of the cannon A'; C', apparatus for instantly stopping the balance; D', toothed sector and ratchet; E', pinion actuating the toothed sector; F', pinion-arbor; G', nut fixed upon the pinion-arbor; H', auxiliary pincers.

The outer coil of the spring being placed between the central arbor U and the small wheel X, the arm T is loosened and the column M is advanced or drawn back by means of the push-piece R until the axes of the two balances correspond, the nut B' being turned to the left or right until the arms of the balances are exactly one above the other; by pressing the lever E the top balance is made to oscillate in the same degree as the standard balance.

If at the end of a certain time the vibrations do not correspond with one another, the acting part of the spring is lengthened or shortened by turning the centre arbor by means of the nut V.

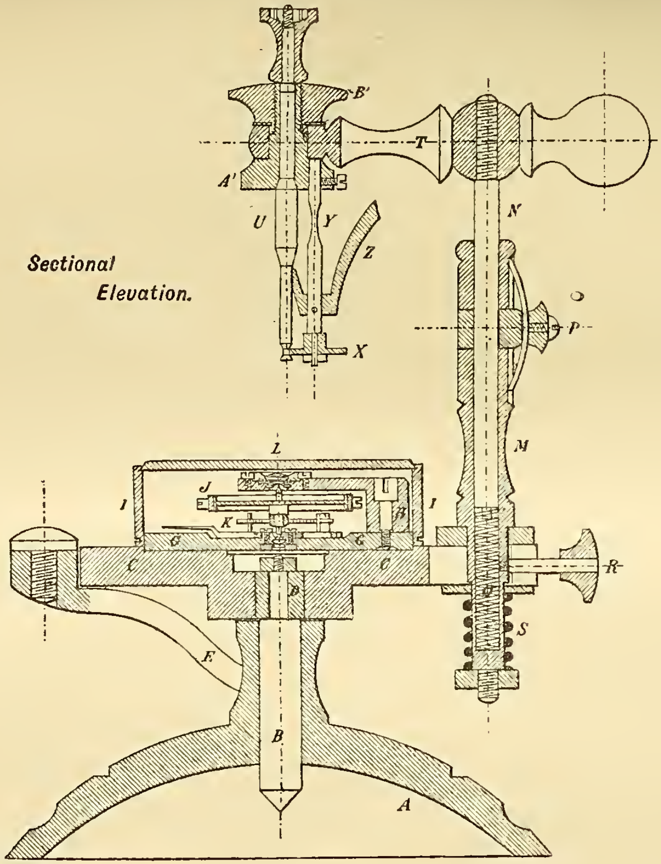
When the two balances are found to oscillate in unison, a chord is formed in the spring by turning the end round, the lever Z removes the small wheel X, and the spring is pinned into the stud, as shown in fig. 3. M. Redard, having experimentally determined the proper distance between the centre of the cock jewel and the passage between the pins of the ratchet, for movements of from twelve to twenty lignes, has described a series of circumferences which he calls a key to the course of the spirals. In practice, this is found by placing the spring under the cock so that its centre corresponds with the jewel-hole, and the outer coil being pinched between the pins, the distance of this turn from the centre determines the course of the spring. The ratchet-needle D' is made to point to the numbered division corresponding to the circle upon which the outer coil comes. The needle of the ratchet is moved by turning the nut G' through the pinion E' and the toothed sector D'.

For more particular regulations, the wheel clip has an additional clip fastened to its side and capable of being moved to the right or left, according to the requirements of the calibres; this clip neatly stops the active part of the spring and permits of its being marked while fixed in its place.

In these machines the divisions, &c., have been found by practical trials with tempered springs.

A careful reference to the drawings will fully explain its action in further particulars.

REDARD'S TOOL FOR COMPARING THE VIBRATIONS OF BALANCES.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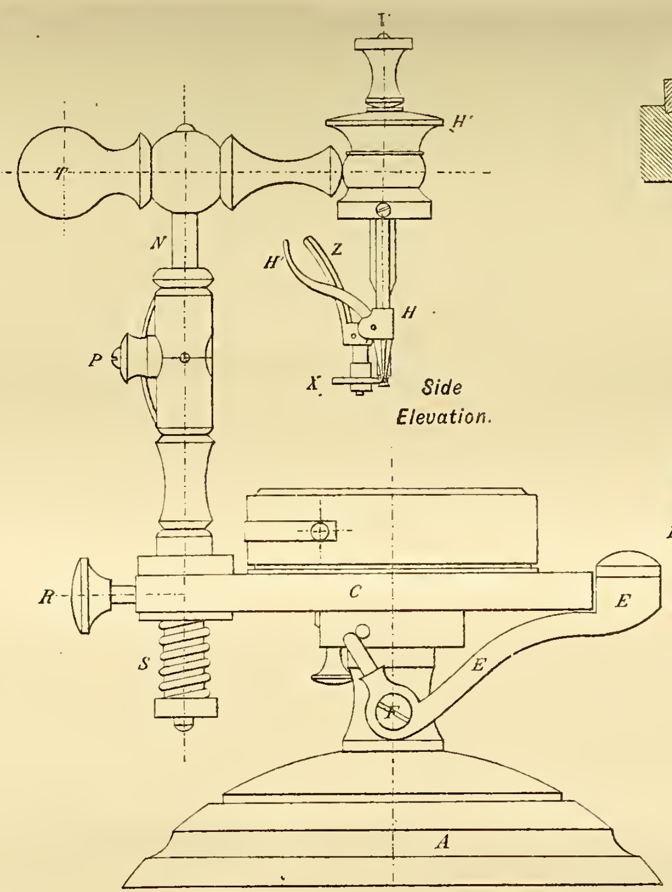
Sectional Elevation.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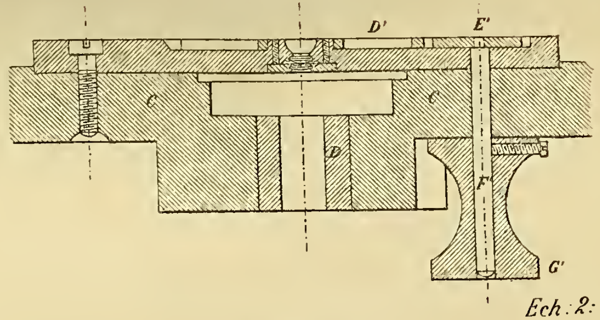
Side Elevation.

Vertical Section.



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Vertical Section.

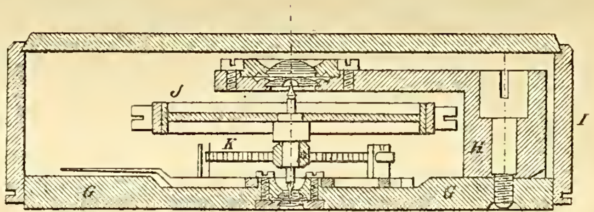

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Fig. 1.

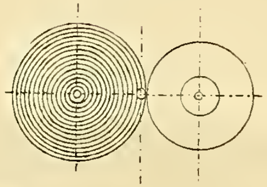

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Fig. 2.

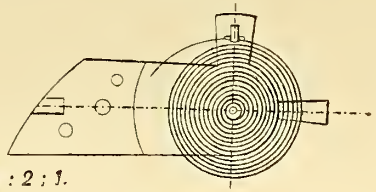

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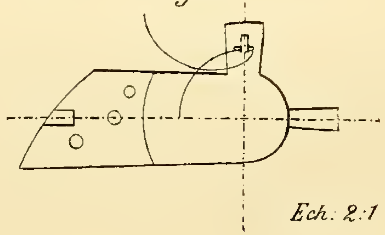
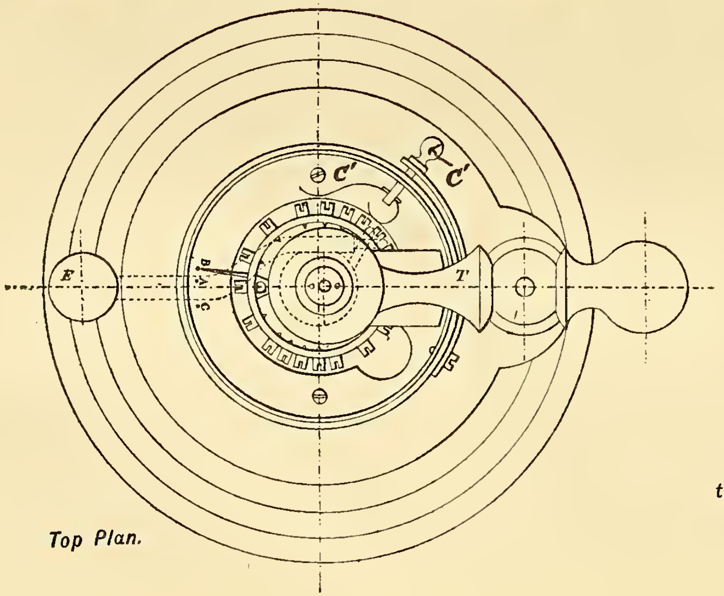
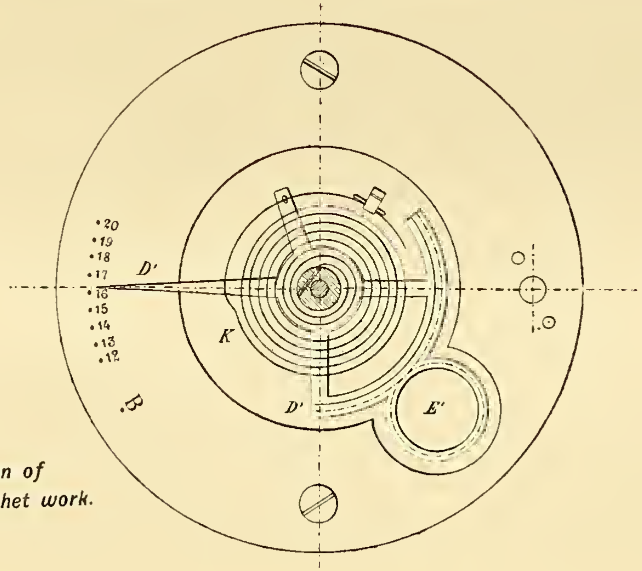
Fig. 3.



Ech. 2:1



Top Plan.


20
19
18
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12
D'
K
D'
E'
B

Plan of the Ratchet work.

Watch Jobbing.

By X. O. N.

(Continued from page 29.)

BUT tweezers that can easily be made from a well-hammered piece of sheet brass will be found most useful; they only want occasional filing up to keep them always in good condition, and there is no chance of scratching or marking polished work with them. One of the commonest ways of spoiling good work is by using bad screwdrivers, for which there is no excuse, as the worst of workmen can make his own and keep them in perfect order. Hard brass wire with short wooden handles should be used for all but the smallest screwdrivers, unless it be for extracting rusty screws, when steel ones should of course be used; and small ones for jewel screws, &c., should fit the notch in the screw and be nearly as wide as the head of it. As for turns, files, broaches, gravers, &c., they will always be good or bad according to the means and taste of the possessor. Therefore I need not dwell longer on the subject of tools, but can refer to them when treating of their uses. When a watch stops its wearer generally comes to the conclusion that it requires to be cleaned, and either that or a broken mainspring are the only causes that nineteen out of every twenty watch wearers imagine can possibly be the matter with it. And these notions have found their way into the ranks of the profession, and when watches are given to the workman it is usually with the instructions, "to be cleaned" or "new mainspring and cleaning;" and as it requires no genius to find out when a mainspring is broken, the watch is *pulled* to pieces, cleaned and put together again without system and without examination. The broken spring may be the only reason why the watch has stopped, and, by chance, the watch may go for years without further attention, but as there are so many things that cause irregularities in the going of a watch, or that will prevent it going, this haphazard style is not to be commended. It so often happens that after the pulling to pieces and cleaning the watch will either not go at all or will only go very badly; that the balance will not vibrate more than half what it should do. Then the workman, especially the young one, is much troubled; he looks at the watch, wonders what can be the matter, tries all sorts of very doubtful expedients, puts oil to holes that already have had enough, and in the end has to take the watch to pieces and go all through a most unsystematic course of examination; and if he is fortunate enough to find the error and correct it, the watch is put together hurriedly, and in a condition, with regard to cleanliness, not much better than when he received it.

As key-winding watches are still the most numerous, I will first treat of the repairs of an ordinary $\frac{3}{4}$-plate lever watch, and suppose that no instructions have been received concerning it. If the watch is not very dirty, and the oil is not in a very bad state, that will be sufficient evidence that the watch has not failed from that cause alone; but even if the oil appears so bad as to account for the stoppage or irregularity, that should not prevent a careful examination of all the parts of the watch. The proper time for this examination is when taking the watch to pieces; that is, the cursory examination that can only be given to a watch with a view to its repairs. When a watch is taken out of the case the hands and dial are usually first removed, and, as a rule, this is easily done; but it is seldom carefully done, and many broken dials are the result, as if the hands, either of them, fit very tight, they are *pulled* off, generally with a pair of nippers. I have seen descriptions of a good many tools for removing the hands, but the simplest and best is a pair of old pliers, with the points softened, bent and filed up like very thin nippers, so that these points will get under the boss or ball of the minute hand, and the wedges pressing in from each side, force up the minute hand without in any way affecting the dial, as the pressure is on the hour wheel and common pinion. Every jobber knows the difficulty of getting the minute hand off some of the Swiss watches without some better tool than a pair of nippers. When the dial and hands are removed, the balance should be taken out and the spring taken off and put into "Benzole" for a few minutes; this will remove dirt or oil should any be found on it; then if the balance is put in its place the endshake can be tried and corrected. If the balance has more than perceptible endshake you may expect irregularity in the timekeeping of the watch; the shake of the impulse pin in the lever watch is not very likely to be wrong, but it should be seen to, as the least sideshake here will lessen the vibration of the balance. The position of the banking pins is likely to be more uncertain, as one of the expedients of jobbers, to which I have already referred, is, when the cleaned out watch will not go, to bend these pins either out or in. Although a lever watch will go, it will not go well with the bankings too wide apart, in consequence of the great amount of run the wheel teeth have on the pallets, and therefore the closer the banking the better if the guard pin is free of the roller in all positions. The amount of shake the lever may have when the watch is in a horizontal position is a bad test, as there may be too much sideshake in the balance stop holes; therefore the only safe way to try this is to hold the watch in a vertical position, the balance uppermost, and if when the balance is made to vibrate slowly, as it will do without the spring, there is just sufficient freedom between the guard pin and on each side of the roller, that part of the escapement will be correct. This is a matter that is often the cause of a watch going badly, and should be particularly attended to; the balance should now be removed, and the endshakes of the scape wheel and pallets examined, also the action of the scape wheel on the pallets. That depth will probably be correct, as it is very seldom the teeth of the scape wheel are found to be worn sufficiently to make the depth too shallow, if originally it has been a right one. If the locking is not safe, that is, if the falling tooth does not drop well over the corner of the pallet plane, a new wheel is the only and easiest remedy. Should the top pallet-staff hole be of brass and the pallets very close to the cock, it will often be found that the oil has been drawn from the hole into the pallets; this in itself will stop the watch and should be remedied by taking out the pallet-staff and turning a good chamfer out of the top side of the pallets; or it may be possible to make more room by pushing the pallet-staff a little further through the pallets. While the chain is on the watch should be wound and the action of the stop-work examined, and also that of the maintaining-power detent; and, if either the barrel or great wheel are touching the plates or much out of upright by the wearing of any of the holes, the position can be noted and the error traced to its source. The mainspring should then be let down, the chain removed and the endshake and sideshake of all the holes observed and the depths looked to; for, although the third and fourth wheels may be jewelled, a not uncommon cause of watches stopping is a bad depth on a pinion the wrong size; and a jobber must not take it for granted that, because a watch has gone for a few years, every part of it was originally correct. If the holes are brass ones and any of the pivots or holes are worn so as to require new holes and repairs to the pivots, the depths should be tried in the depthing-tool and re-made, irrespective of the old holes; and as the actions of the wheels and pinions are always nearer to the pillar plate than the top plate (of an English watch), the depth should be made in the pillar plate and the upright taken from it. All the wheels or arbors of a watch should be upright, but it is essentially necessary that the centre and fourth wheels shall be so, else the hands will touch one side of the dial, while they will be too far away from it on the opposite side.

Supposing a new centre-wheel lower hole is required, and, as is often the case, the pivot is cut, the pivot should first be repaired; and if the great wheel and third wheel depths have been originally correct, the best plan will be to push out the old stopping in the plate, drill a hole in a piece of brass nearly as large as the pivot, and turn the stopping to fit the hole—this being the way most finishers stop this hole, it will leave the depths as they were originally and is much easier riveted than a solid stopping. When the hole is broached to fit the pivot and the rivet of the stopping is turned down, if a new hole is required in the top plate, the upright should be got in as follows (by what is called pegging the hole):—Place the centre of the mandrel in the

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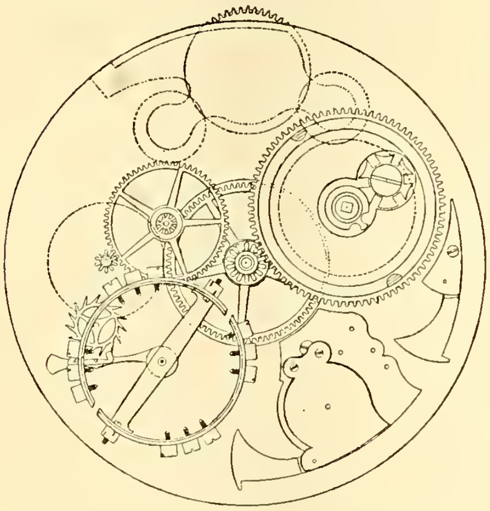

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Keyless minute repeater	*73*
Keyless half-quarter repeater	*64.8*
Keyless minute repeater, minute chronograph	*71.6*
Keyless minute repeater	*75.7*
Keyless minute repeater	*76.2*
Keyless minute repeater	*78.3*
Keyless fly-hack minute chronograph	*68*
Keyless fly-back chronograph minute repeater	*60.6*
Double fly-back keyless chronograph	*50.0*
**Keyless minute repeater, minute chronograph, perpetual calendar watch*	*69.5*
Keyless minute repeater	*73.1*
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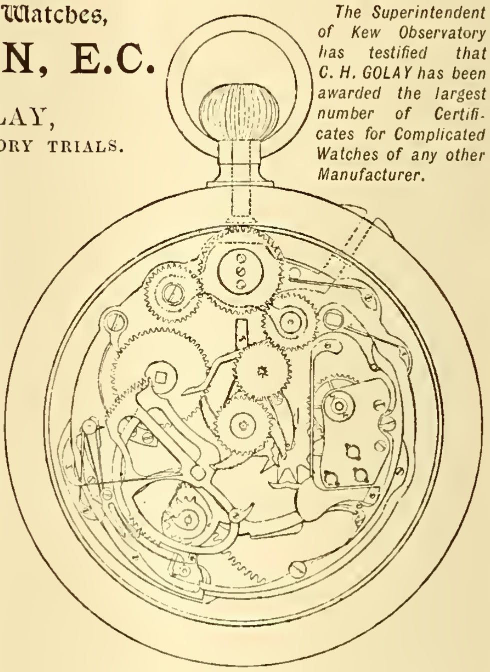

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centre hole and grip the plate with the dogs near to the outside edge of the plate, so that they may not be in the way of the top plate when it is put into its place ; bring the rest of the mandrel within about an inch of the plate ; cut a point on a long peg and insert the point in the centre hole, allowing the peg to lie on the rest ; turn the mandrel round slowly, and if the outer end of the peg moves up and down, the frame must be tapped gently on the edge until the motion of the peg is scarcely perceptible ; screw up the dogs, and, if a stopping has been riveted in the top plate, the plate can be screwed into its place and the hole drilled and broached in the mandrel to very nearly the size of the pivot.

(To be continued.)

On the Balance Spring of Chronometers and Watches.

By M. Phillips.

Translated from the French for The Watchmaker, Jeweller and Silversmith, *by* D. Glasgow, Jun.

IN submitting to the Society[*] my memoir on the balance spring of chronometers and watches, I have thought it proper to present a succinct *résumé* of the principal results obtained in that work.

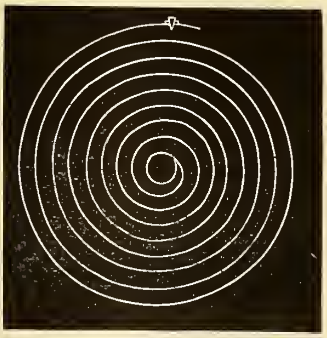

Fig. 1.

We know that, in the portable instruments which serve to measure time, the spiral spring and its balance together perform the office of regulator, as does the pendulum in clocks.

In practice, two kinds of spring are employed—the flat and the cylindrical.

The first (fig. 1), usually applied to watches, is composed of a plane spiral curve, formed of a certain number of spires, generally from eight to twelve, approaching as much as possible to the circular form, and traced round the axis of the balance.

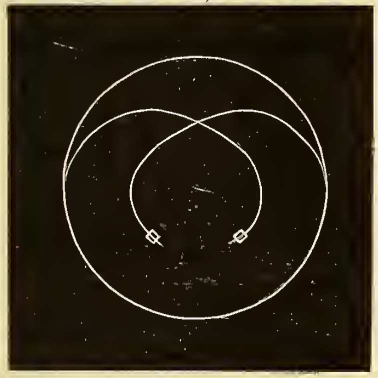

Fig. 2.

With regard to the cylindrical spring (fig. 2), which is made use of more especially in chronometers, its spires take, in horizontal projection, the form of a circle concentric to the balance axis, and it terminates generally in two gentle curves, which approach to the centre at a distance ordinarily equal to about half the radius. Its strict form is that of a helix of extremely short gradations, from which it takes the name "cylindrical spring."

Notwithstanding some disputes which have occurred as to its origin, it appears now fully demonstrated that it is to Huyghens we are indebted for this important discovery, as we owe to P. Leroy that of the possibility of the isochronism of the spiral spring. But if the theory of the pendulum has been established since the time of Galileo and Huyghens, it is not the same as that of the balance spring, the essentially complex form of this spring escaping all the known formulas of the laws of elasticity. It is this gap that I have by particular combinations succeeded in filling.

The principle which has served me as a point of departure is that of the neuter axis; and I observe besides, that I have demonstrated, in the conditions of the problem, that it comes strictly within the mathematical theory of elasticity as it has been established principally by the works of Navier, Poisson, Cauchy, Messrs. Lamé & Clapeyron.

I will add that I have submitted to experiment under the most varied conditions all the consequences of theory, and that the accord is always found as perfect as could be desired.

I will now expound shortly some of the principal results which proceed from my work.

The first law which I have arrived at is that which makes known the duration of each oscillation of a balance united to a given spring ; the formula which expresses it is the following :—

$$T = \pi \sqrt{\frac{AL}{M}}, \text{ in which}$$

T is the duration of a single vibration in relation to the second ; L is the developed length of the spiral spring ; M, the moment of elasticity of the spring ; π, the relation of the circumference to the diameter ; and A the moment of inertia of the balance.

This formula indicates the isochronism of the vibrations, since it does not depend on the amplitude of the arcs.

It presents, as we see, a great analogy with that of the pendulum. Thus, for example, that the duration of the vibrations of the spiral is (all things otherwise being equal) proportional to the square root of the developed length, as, in the pendulum, the oscillations are performed in the time proportional to the square root of its length ; and this analogy is so much the more remarkable as there is not in the two cases any similitude, either between the body in motion or the forces which move it.

The preceding formula also makes known the manner in which the duration of the vibrations varies, if the balance or the transverse section of the spring change.

It permits, in short, of immediate calculations of the length of the simple pendulum, which should perform its oscillations in the same time as a given spring and balance.

I am also taken up with the question of isochronism. The calculation indicates that there are two fundamental conditions which must be satisfied :—

1st.—That the centre of gravity of the whole spring must be upon the axis of the balance and rest there during the movement ;

2nd.—That the spring does not in its action exert any lateral effort against the balance pivots.

In examining more especially the cylindrical spring, I have demonstrated that this latter condition, to wit, the annihilation of all lateral pressure against the balance axis, may very simply realise the first, as the spring during its play opens and closes always concentrically to the axis.

Now we may satisfy this obligation by certain forms of terminal curves of the spring, forms of which I have determined the law ; and it is remarkable that the same curves fulfil at the same time the first condition mentioned above and which consists in the centre of gravity of the spring being wholly and remaining always on the axis of the balance. There exist then types of extreme curves presenting besides an infinity of different forms which satisfy at once all the conditions indicated. The law of construction of these curves is very simple and is relative to the position of their centre of gravity. It consists in this, that (fig. 3) :—

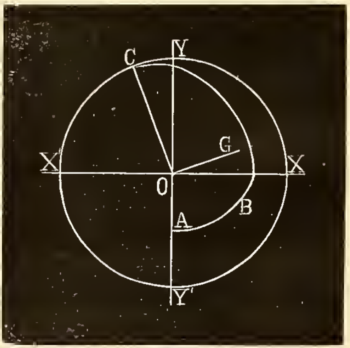

Fig. 3.

1st.—The centre of gravity, G, should be found upon the perpendicular, OG, governed by the extreme radius, OC, leading from the centre O to where the curve rejoins the spirals at C ;

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[*] Société d'Encouragement pour l'Industrie Nationale.

2nd.—The distance, OG, from this centre of gravity to the centre of the spirals must be equal to a third proportional of the developed length of the curb and of the radius of the spirals, that is to say, that

$$OG = \frac{\overline{OC}^2}{ABC}$$

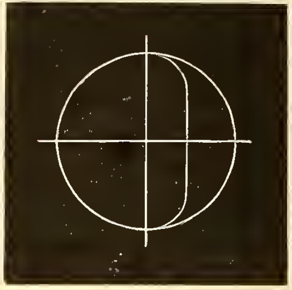
Fig. 4.

I have indicated in my work a very simple method for graphically determining, in all possible cases, the forms of extreme curves satisfying the foregoing conditions, and have given a sufficient number of examples obtained in that manner. We may remark among them further certain types, more or less analagous to those employed in practice, some of which present novel aspects, such as curves ending at the centre of the spires, and others, on the contrary, terminating at a point in the circumference of these last. For example, we see (fig. 4) a curve formed by two quarters of a circle joined by a straight line, each of these quarters of a circle having a radius of half that of the spiral; another type is composed (fig. 5) of a demi-elipse, of which the great axis is the diameter of the spirals, and the demi-little axis is 0·58 of the radius.

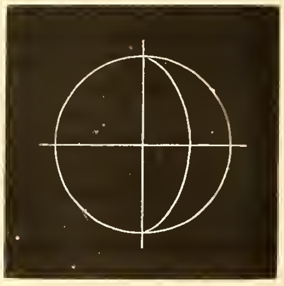
Fig. 5.

The form of the extreme curves is completely independent of the transverse dimensions of the plane and also of the total length of the spring, so that, whatever be the angle following that should be projected upon a plan perpendicular to the axis, the radians joining the beginnings of the extreme curves of a like spring, this would always possess the same qualities.

And, furthermore, these curves have also the result of dispersing certain perturbations prejudicial to isochronism or to its preservation. Thus the absence of all pressure against the axis of the balance realises the free spring; that is to say, that in which this axis, not having any pressure, is separated as much as possible from frictional variations and the consequent thickening of the oils.

Besides, the spring opening and closing always concentrically to the axis, instead of being thrown from side to side in the vibrations, as it generally is, the disturbances introduced by the inertia of the spring are sensibly avoided.

All the preceding properties due to these curves being in force, whatever be the angular space that separates, in construction, the two terminal curves of a given spring, we possess, in this angle, or, what comes to the same, in the total length of the spring, an element by means of which we may obtain the last limits of practical isochronism, disregarding secondary influences which it is impossible to take into account in the calculations, such as oils, escapement, &c. This element is, besides, precisely that by means of which we ordinarily, and after the rule of Pierre Leroy, arrive at—as well as possible—isochronism.

The calculation does not indicate that it is not possible in any other way to obtain isochronism, but it puts the aforesaid entirely in evidence. With regard to the ordinary spring, which is especially employed in watches, in treating the question by the same method we arrive at this conclusion, which is otherwise in accord with experience: that we can only obtain isochronism by the feeble oscillations of the balance. Meanwhile, the best results are obtained with the flat spring, called *ramené* (Eng., "overcoil"), in which the end that corresponds to its fixed extremity terminates in the form of a curve, brought back more near to the centre with the object of making the spring develop more concentrically to the axis and giving it a better action. It is suitable then to take for this curve one of the theoretical types previously described.

In addition to the preceding subjects I also treated many other questions, of less capital importance, but, nevertheless, worthy of attention.

Thus it was very interesting to know what are the proportional lengthenings and shortenings which the spring undergoes during its deformations. The simple formula which makes them known is:—

$$i = \frac{e}{2} \frac{a}{L},$$

where i is the proportional lengthening or shortening; e the thickness of the wire of the spring; L the total length; and a the angle in which the balance is dispersed from its position of equilibrium, measured in a circle of which the radius would be the unit.

We see by this that the effort which measures the work of the wire is (all things otherwise equal) proportional to its thickness and to the angle of rotation of the balance, and, consequently, inversely proportional to the length of the spring.

Everyone knows the influence exercised by changes of temperature upon the going of a chronometer or of a watch. This cause of irregularity has already been combated by the employment of the compensation balance. I have further investigated the effect exercised by this same cause on the spring itself. I have indicated especially the means of arriving at the essential result, viz., that the spring, being primitively placed in a free state, shall continue to remain so when the temperature changes; and, further, that, notwithstanding the dilatation or contraction which ensues, it shall always preserve the theoretical form given, in construction, at its terminal curves. In short, I have examined the question of friction of the balance, and shown, conformably to received ideas, that, in order that this may be disregarded, it is best for the amplitude of the oscillations to be the largest possible.

I have thought it useful to show, by a certain number of quotations borrowed from the authors and experimenters who have most occupied themselves with these questions, that the greatest part of the principles to which I have been brought by theory all perfectly accord with the ideas generally admitted, and to which practice has successively conducted.

Such are the conditions relative to the spring concentric to the axis; to the centrage of the spring: to its liberty; that is to say, to the suppression of the lateral pressure and of the friction resulting from it. I shall mention, on this subject, Ferdinand Berthond, Yurgensen, Ch. Frodsham, &c., whose names give authority in chronometrical art.

The memoir terminates by a detailed description of all the practical verifications to which I devoted myself; they bear upon two principal points:—

1st.—The formula which gives the duration of the vibrations of a spring and of a given balance;

2nd.—The properties of extreme theoretical curves.

The formula of the duration of the vibrations has been verified in two ways.

In the first place, I have applied it to a certain number of existing watches and chronometers. Here are, among them, some examples:—

		Duration of a Vibration.	
1	Constructors	By Theory	By Observn.
Watch (flat spring) ...	Lépine	0'',20151	0'',200
Chronometer	Winnerl	0 , 2486	0 ,250
Large cylindrical spring	Paul Garnier	1 , 244	1 ,247

I have also made experimental proof of this law; similarly to and after that of the pendulum (all things otherwise being equal), the duration of the vibrations is proportional to the square root of the length of the spring. Here are the results of some of the single observations:—

Watch by Lépine.

Flat spring of 0^m, 1524 length.

We cut off an end of 0^m, 032, which reduced the length to 0^m, 1204, and remounted the shortened spring. On comparing the going in the two cases, we have:—

Comparison of the times ... ... = 0, 8913

Comparison of the square roots of the lengths = 0, 8889

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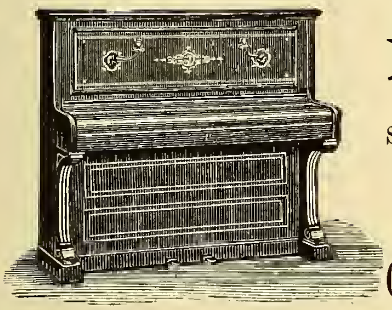

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At the Sydney Exhibition, 1880, two First-Class Awards were obtained; and although the Watches were not expected to be entered for competitive trial, they obtained, at the Government Observatory at Sydney, higher marks than those of any other Exhibitor.

On cutting yet 0^{m}, 0309, we have :—
Comparison of the times ... ... = 0, 7746
Comparison of the square roots of the lengths = 0, 7663

Large springs of M. Paul Garnier.

These are two large cylindrical springs mounted on equal balances; they are made of the same steel, but of different lengths, which are respectively, 1^{m}, 6855 and 1^{m}, 3816. In counting the oscillations of the two instruments during a like time, we obtain :—

Comparison of the times ... ... = 0, 904
Comparison of the square roots of the lengths = 0, 905

Springs of M. Rozé.

M. Rozé, a member of the Society of Horologers, has also constructed springs to repeat this experiment; they are two in number, mounted upon equal balances, and are made of the same steel wire *à spiral;* their lengths are 1^{m} and 0^{m}, 810. We have :—

Comparison of the times ... ... = 0, 8988
Comparison of the square roots of the lengths = 0, 9000

M. Rozé has since modified this instrument in the following manner :—He has made three springs, mounted upon three equal balances. Their lengths are respectively, 0^{m}, 9958, 0^{m}, 80617 and 0^{m}, 666.

Then, in 182 seconds, the first made 180 vibrations, the second 200, and the third 220.

In comparing the first and the second, we have :—
Comparison of the times ... ... = 0, 9000
Comparison of the square roots of the lengths = 0, 8998

In comparing the second with the third, we have :—
Comparison of the times ... ... = 1, 1000
Comparison of the square roots of the lengths = 1, 1002

We may, then, regard this law as quite exact.

I pass to the experiments which relate to the extreme theoretical curves. On this subject I have verified at first the influence of these curves upon the deformation of the spring, and proved, by numerous instruments constructed for that purpose, that with such curves the spring is distorted always in a manner perfectly cylindrical and concentric to the axis, while it must be so of many in which the curves fail to fulfil the theoretical conditions. I have given in my memoir a great number of tracings obtained in this manner, where this fact is most completely evidenced. Moreover, one may prove it oneself by the instruments which still exist.

I have also made a series of observations for the purpose of proving the following point :—If in a spring the tension, that is to say, the tangential force necessary to fortify it or to maintain it at a given angle from its position of equilibrium, were always proportional to that angle, after the fundamental principles of mechanics, one would be in the most favourable conditions for obtaining isochronism. This idea is, besides, spread now in practice everywhere, and has served as a point of departure in the researches of many experimenters, such as F. Berthond, Houriet, of Locle, Ch. Frodsham, &c. It is also in this manner that I have proceeded, and I have proved, with the aid of an instrument founded on this principle, that the law of proportion that I mention is always much better satisfied with all springs furnished with theoretical curves than with those terminated by chance curbs.

In short, I have indicated a most important fact, in which the experimental proof affords great interest; this is, that for a theoretical spring, the elimination of all lateral pressure of the balance against the pivots is proportional to the friction which results from it. The apparatus constructed with this object by M. Rozé is very simple, and consists of a spring with theoretical curves mounted on a balance, the axis of which is sustained by a foot, but the upper part of which is completely free. Consequently, the least effort exercised laterally during the play of the spring, and by this against the balance, would have the effect of imparting to the axis a partly oscillatory and partly vertical movement, and to the balance perturbations corresponding to its simple movement of rotation. Now, in the action of the instrument, the axis rests perfectly vertical and the balance horizontal; this accords with theory in eliminating the pressure of the spring against the balance. On the contrary, with an instrument of comparison which has been similarly constructed, but with the terminal curves non-theoretical, the axis of the balance gives a very pronounced oscillatory movement.

In short, it has appeared to me useful, in conclusion, to mention some examples of curves which, in practice, have given very good results in going and which are altogether analogous to certain of the types to which I have been conducted by theory.

The Gold Mines of Ballarat.

IN an article on the "Colony of Victoria," in connection with the Colonial and Indian Exhibition, *The Illustrated London News* says:—"Ballarat, the second largest city of Victoria, is situated one hundred miles from Melbourne and has a population of 40,000. It well deserves the title of the 'Golden City,' for no district in the world ever produced so much gold in so short a time. In the old time colossal fortunes were sometimes made in a few days, with no more appliances than a pick, a shovel and a tin wash-dish. In one claim alone, only a few feet square, a man and his son took out £60,000 in a little over a week's work. The 'Welcome' nugget, found in 1858, of which a model is exhibited in the Victoria Court, was sold for £10,500. In another claim one tubful of wash-dirt yielded £3,235 in gold. These were all surface workings; but experience has shown that the deep ground at Ballarat is almost equally valuable. The alluvial diggings are still carried on at a depth, in many instances, of several hundred feet, and sometimes considerably deeper. Some of these underground alluvial workings extend over an enormous area, and having yielded heavy dividends for many years past, still continue to pay handsomely.

"Sandhurst, the third city of Victoria, distant a little over one hundred miles from Melbourne, has a population about equal to that of Ballarat. This is the great quartz-reefing district of the colony, and here are situated some of the most extensive gold mines in the world. The average yield of gold, per ton of quartz, is not more than one-third as great as that of Charters Town, in Queensland; but the output of quartz is far greater, owing to the field having been much longer in existence. The reefs, as a rule, are of a considerable size; and the machinery being of the most perfect description, dividends can, in many cases, be paid from a yield of four hundredweight of gold to the ton of quartz. There are now many mines from which very rich quartz is being obtained, from depths varying from 1,000 to 2,000 feet; and fresh reefs have recently been struck, the existence of which could never have been suspected from any indications nearer the surface.

"Extensive and important as are the known mines of Victoria, the total area of them is insignificant compared with what will undoubtedly be opened up as time progresses. A true reef is practically inexhaustible, whereas an alluvial claim is capable of being completely worked out; so that, in the future, the yield from quartz will progressively exceed that from alluvial working.

"To show the gross amount of gold raised from some of the principal mines, we mention that the Madame Berry mine, at Creswick, the premier alluvial, has yielded 120,000 ozs.; the Band of Hope and Albion Consols, 519,551 ozs. alluvial, 105,889 ozs. from quartz; the Long Tunnel, Valhalla, 447,308 ozs.; the Port Phillip and Colonial Company's, at Stawell, 320,000 ozs.; and the Garden Gully and United Gold Mining Company, at Sandhurst, 285,000 ozs."

A Correspondent of the *Electrical Review* suggests that a simple alarum may be made by cutting a small groove in the front, or bezel, of a common watch, to allow a wire, insulated from the case but bare at the end, to pass through; the wire, being connected with a bell circuit and lying close to the face of the watch, may be arranged to come in contact with the hour hand, and so complete the circuit at seven or eight o'clock, or any hour required, and the bell will continue to ring until the wire is removed.

Electric Clocks.

By J. STEPHEN.

(Continued from page 30.)

SOME mention has been made of the electrically-driven clocks of M. Hipp, of Geneva. M. Hipp is well known as the inventor and maker of several very ingenious meteorological and other indicating instruments, and his electrically-driven clock differs somewhat from Bain's, as we have seen. M. Hipp's idea has been to so arrange matters that a normal-gravity pendulum shall, by its movements, drive the hands of his clock; the electrical impulse being given only when the arc of oscillation of the pendulum shall have become small.

To effect this the pendulum bob is a soft iron armature. When the pendulum hangs vertically, the iron bob is a little to one side of a fixed electro-magnet having its poles looking upward. Should the electro-magnet become energised, the armature would travel to a position directly over the poles; and were the current energising the magnet then cut off, the pendulum would travel onward by virtue of the impulse thus given. To ensure that this impulse shall only be given when the arc of vibration is small, M. Hipp has arranged a circuit-making arrangement in this way: To the pendulum rod is attached a light wire, free to swing in two planes—one the plane of the main pendulum's movement, the other at right angles to it. At or near the bottom of it is arranged a light mica vane, or pair of vanes, shaped like a butterfly, from which fact the clock gets its name, "The Butterfly clock." Assume the pendulum to be started, we shall find that the butterfly will, so long as the arc of oscillation of the main pendulum be large, flutter outwards and keep free of a metal piece forming one terminal of the electro-magnet. If the arc become small, the butterfly will take up motion in a plane which will cause it, or, rather, a metal piece connected with it, to make contact with the terminal of the electro-magnet. The other terminal of the electro-magnet passes to one terminal of a battery, and the other terminal of the battery is connected to the light wire carrying the butterfly. When, therefore, the light wire touches the terminal of the electro-magnet, a current passes round it and the armature gets drawn forward. Simultaneously the butterfly again passes to one side and for several excursions no contact is made. When, however, the arc again falls sufficiently, a contact is again made, and so on, *da capo*.

In the earlier clocks made by Hipp, instead of the butterfly arrangement, there was a little moveable "click" at the bottom of the pendulum; when the arc was large, the little "click" occupied a position almost horizontal to the line of the pendulum rod and contact was not made. When the arc became small, the "click" became more nearly in a line with the pendulum rod and a contact was made as it passed over a wire. The idea was excellent, but the best results could hardly be expected. It will be seen that the movement of the pendulum ensuing upon the magnet's attraction of the armature, is actually a movement at right angles to the line in which the force acts. The friction on the pendulum's point of support becomes enormously greater at each moment when the force is applied, and it may well happen that the electro-magnetic attraction, which is intended to hasten the pendulum's movement, may, at a part of its course at least, do much toward stopping it altogether. M. Hipp's clocks are so pretty and fascinating to watch, that one is apt to forget that the first essential of a clock is good timekeeping. If one does not mind the timekeeping qualities they do admirably as "drawing room" clocks, and have the supreme advantage of needing no winding. A clock will go for many months without any attention whatever, and nothing can be more interesting than to watch the automaticity of all its actions.

Perhaps the first very practical outcome of Bain's invention of his electrical clock was his application of the principles of his electrically-driven clock to the timing of other clocks by one standard one. Though Bain described all the methods of doing this, and actually was the first to put up electrically-controlled clocks, for some reason the credit is generally given to Mr. Jones, of Chester, a railway official, who arranged a number of clocks in electrical circuit and had them all controlled by one standard clock. It was found by him that excellent results were to be obtained by fitting Bain's pendulums to ordinary weight-driven clocks; that the weight-driving and electrical-driving harmonised quite well; and that, moreover, a very feeble current sent through the pendulum was enough to make the movements of the pendulum synchronous with the standard clock's pendulum. Thus, at small expense and with a feeble current, a coarsely made and cheap clock could be endowed with the timekeeping virtues of the best astronomical clocks.

In this direction, then, the greatest amount of work has been done of late years. Messrs. Ritchie, of Edinburgh, have their names honourably identified with this method; and the late Sir Charles Wheatstone invented a system of magneto-electric clocks, dispensing entirely with voltaic batteries and depending upon magneto-electric currents, generated by the movement of a coil over the poles of a large magnet, passing through the coils of subsidiary clocks and giving movement to armatures there, these movements being caused by and synchronous with the movement of the generating or parent pendulum.

(To be continued.)

The Coral Reefs of the Solomon Islands.

AT the last meeting of the Royal Society of Edinburgh, held under the presidency of the Hon. Lord Maclaren, Dr. John Murray, of the "Challenger" expedition, submitted a paper on the mode of formation of the coral reefs of the Solomon Islands, by Mr. H. B. Guppy, surgeon of H.M.S. "Lark," who had spent some three years in the neighbourhood of these islands. Before the vessel had started Dr. Murray had stated to Dr. Guppy a series of points which would be worthy of observation, and in the paper these were answered in considerable detail. Dr. Guppy, in the course of his observations, had gathered between seventy and eighty varieties of coral, of which some thirty or forty were stated to be new species. The paper first described the typical reefs of these islands, with the species of coral found on the windward side, and the species found on the leeward side, along with those found inside the lagoons, which were found to reach their greatest growth and variety where the water came in and out of the openings. An account was given of the relations of the animals which live upon the reefs, in particular of a small crab that finds its home among the branching millipora, whose body takes the colour of the coral bed, and whose claws held up for prey take the bright red colour and markings of the coral branches, from which they can scarcely be distinguished. Taking up the question of reefs and shoals, the paper stated that wherever these are placed in the full sweep of the trade winds, they do not rise to a greater height than seven or ten feet from the surface. In the Straits, where they are more sheltered, they are found at a depth of four or five feet from the surface. In observations taken some hundred years ago these reefs were found at the same depth, so that Dr. Guppy was of opinion that these reefs never rise to the surface without upheaval. The paper afterwards discussed the various kinds of barrier reefs, giving the opinion that these reefs do not commence to grow at the shore, but a little way out, and that the reef is built up towards the shore, leaving a space near the shore which forms the lagoon channel—a theory which corresponds with that stated by Le Conte forty years ago to explain the reefs of Florida.

MR. OWEN ROBERTS, of the Clothworkers' Company, has resigned his position of Honorary Secretary to the City and Guilds of London Institute for the Advancement of Technical Education, in consequence of the pressure of other work.

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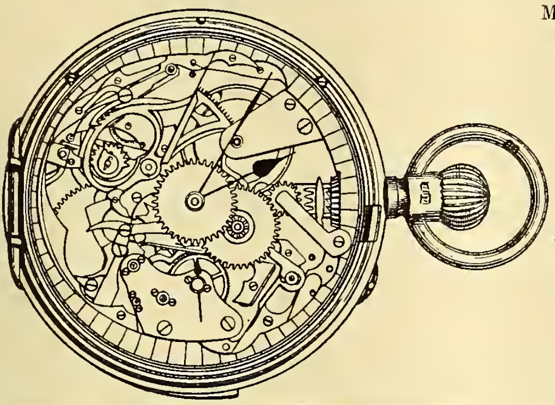

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MESSRS. STAUFFER, SON & CO., of No. 12, Old Jewry Chambers, in the City of London, and Chaux-de-Fonds, Switzerland, Watch Manufacturers, having had their attention drawn to the fact that they have unintentionally and unwittingly adopted as a design on some of their watches the mark "S & CO ***," which resembles in form and appearance the registered Trade Mark No. 14,265, "B & CO ***," of Messrs. BAUME & Co., of No. 21, Hatton Garden, London, and of Geneva, Switzerland, do hereby express their regret for having thus unknowingly and unintentionally encroached upon such part—namely, the three stars—of Messrs. BAUME & Co.; and Messrs. STAUFFER hereby notify to all their customers and whomsoever else it may concern that they have already discontinued, and shall discontinue in the future, to use the three stars on their watches.

Signed by the said Messrs. STAUFFER & Co.,
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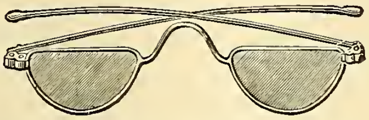

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The International Exhibition, Edinburgh.

EDINBURGH is a city of engrossing historic interest. There is, perhaps, no other city in the kingdom which so closely links the past with the present. And it is a matter of peculiar interest that, in an Industrial Exhibition held there, some exhibits should link the quick life of to-day with the antiquity and traditions of a bygone age.

The Edinburgh goldsmiths of the olden time were regarded as a superior class of the community. It was their custom to appear in public with cocked hats and scarlet cloaks; and they were looked up to by many classes who now look down upon them. There is one name which is inseparably connected with their craft—that of George Heriot, the good-humoured, honest "Jingling Geordie," so well pourtrayed in Sir Walter Scott's *Fortunes of Nigel*. In his booth—some seven feet square, under the shadow of St. Giles's, where he was wont to await the visits of his Royal master—he designed and manufactured for his own use the famous drinking-cup now in the possession of the hospital he founded and endowed. This cup—a veritable relic of antiquity—is displayed at the stand of Messrs. J. Robertson & Sons, in the Grand Hall of the Exhibition.

There are also two other exhibits—both at the stall of Marshall & Sons, 87, George Street—which throw not a little light upon the work of the Scottish silversmiths for the last three hundred years. One is a collection of old Scotch communion plate, dating from 1533 to 1800; and the other is the insignia of the Royal Company of Archers.

The cups have been gathered together from the different parish churches in Scotland, and they form a collection of great antiquarian value. The designs and inscriptions of many of them are unique, and the membering of some of their stems is both noble and rich. Through their associations they appeal to almost every Scotsman who enters the Exhibition, for they carry the mind back to the time when there was one King and one Church; and they are silent and eloquent witnesses of the struggles for freedom of the sixteenth and seventeenth centuries. At many conventicles on hillside and moor they have been used, and numbers of those who drank from them afterwards "scaled their testimony with their blood."

The development of the process of *repoussé* is a marked feature of the Edinburgh trade of this century. The old craftsmen of the seventeenth and eighteenth centuries depended much more—as may be seen from the old plate exhibited—upon engraving than upon chasing and embossing as a medium for decoration.

The specimens of modern work shown are in every way creditable. Two or three of them might be singled out as worthy of special notice. At the stall of J. Crichton & Co., 47, George Street, are shown two large shields, from designs of the *Midsummer Night's Dream*, by Sir Noel Paton. The Ayr Gold Cup (1883), in style resembling a vase of the Cellini period, and a clock case in silver, which was awarded a prize at South Kensington, will also repay close examination. At the stall of Marshall & Sons, 87, George Street, are displayed a number of large pieces of racing plate and the "Bannockburn Shield"—a volunteer trophy for the north of Scotland. These illustrate the progress Edinburgh has made, and show the capabilities she possesses of turning out large work within her own workshops.

One of the most interesting features of the goldsmiths' display is the engraving of David Macgregor, Perth. His is a name well known both to the trade and the public. The quality of his workmanship is such as to have called forth a eulogy from Mr. Ruskin. Its peculiar feature is the producing of engraved portraits on gold and silver. At the recent visit of Her Majesty to the Exhibition, special notice was taken of several of these portraits.

The number of jewellers in the Grand Hall is not many, but the amount of work shown is remarkable for its diversity and its comprehensiveness. Silver spoons and forks are exhibited in all stages of their manufacture: electro-plating, gilding, burnishing and engraving are shown by T. Smith & Son, Glasgow. No two jewellers have hit precisely on the same branch of the trade as the strong point of their display, and, consequently, all of them merit and amply repay a close examination.

General Notes.

A NOVEL application of the pendulum to telegraphic and telephonic work has been invented by our contributor, Mr. Johnston Stephen, by means of which a number of subscribers may be on a single line without interfering in any way with one another while in communication, one central exchange only being required; while its application in telegraphy prevents a message sent to any one station from being "tapped" by the operators at any of the others. The principle of the system is in having pendulums of different lengths at the various stations, which are severally actuated by intermittent currents at different intervals, and which automatically open and close the circuits by means of a switching apparatus; thus, when one is opened, the others are simultaneously closed, and *vice versâ*. The apparatus has been successfully operated for some time.

THE ORIENTAL CONGRESS.—The Commission of the Seventh Oriental Congress, which will meet this month at Vienna, has already received upwards of three hundred applications for membership from foreign Orientalists, including thirty-three from the United Kingdom and eleven from British India. Among the best known names are, from Oxford, Professors Sayce, Max Müller and Sir Monier Williams; from Cambridge, Professors Cowell and W. Wright; and from Edinburgh, Professor Davidson. The Royal Asiatic and the Royal Geographical Societies will be represented by Mr. R. Cust; the Biblical Archæological Society by Messrs. Rylands and Gates; and the India Office by Dr. R. Rost. The Indian Government has announced as their delegates Messrs. Fleet and Grierson, and Dr. Hornby, the latter also representing the Asiatic Society of Bengal. The native chiefs of Kattywar have subscribed 2,500 rupees to defray the expenses of a native scholar who will attend the Congress.

AN EXHIBITION AT NEWCASTLE.—Following the example of London, Liverpool and Edinburgh, the public men of Newcastle-on-Tyne have put forward a scheme for a great International and Colonial Exhibition, to be held next year, in commemoration of the Queen's jubilee. Plans prepared by Mr. W. Glover, a vice-president of the Northern Architectural Association, have been adopted, and the Town Council has endorsed them. Eleven acres of land adjoining the site of the Royal Agricultural Show, and within a mile of the central station, have been secured by the Corporation, and buildings will be put up having an area of over 226,500 superficial feet. A large guarantee fund has been raised, and the promoters have every reason to anticipate a most successful exhibition. The divisions include a full working model of a coal-mine, showing both underground pit-workings and works above ground, and the various descriptions of machinery employed in modern engineering and naval architecture. Arts as well as science will also figure conspicuously. The exhibition will be opened on the 26th of May, 1887.

THE report of the City and Guilds of London Institute shows that 329 classes were held last session in 116 towns, which classes were attended by 7,660 students; 4,764 candidates presented themselves for examination from 192 centres in 48 different subjects, of which 2,137 were rejected, the percentage of failures being 44·8, showing a decrease of ·5. The number of honours certificates awarded show an increase of 216 over those of last year—622 against 406.

IT appears from observations of the new apparatus in use at Greenwich for recording the readings of thermometers, that the average range of temperature during the day is less at twenty feet above the ground than it is at four feet.

THE American *Manufacturing Jeweller* is offering a cloth-bound copy of Glasgow's *Watch and Clock Making* as an inducement to new subscribers to come forward to that journal.

The remarkable success achieved at the Kew Observatory Watch Trials this year by Mr. C. H. Golay with complicated watches of all descriptions, which is sufficiently attested in his advertisement appearing on another page, is a gratifying proof of the excellence still maintained in English watch-timing, and we heartily congratulate him on the results. The appearance of a few more such advertisements would do more to benefit the English watch trade than any amount of press fulminating.

The establishment of Messrs. Streeter & Co., 18, New Bond Street, is just now especially rich in its collection of precious stones, among them being several objects of more than ordinary interest, to be seen by special permission from the firm. These comprise, among other noteworthy gems :—The great "Victoria" diamond, which weighs 406 carats ; it was found at the Cape and is the largest diamond yet discovered. It is proposed to present it to the Queen at her Jubilee in June next year. An orange coloured cut diamond of great brilliancy, weighing 115 carats, or ten carats more than the Koh-i-noor, set round with a border of large white brilliants ; the largest black diamond ever found ; the formation of pearls found off the coast of Western Australia and known as the "Southern Cross," from the resemblance of their disposition to that constellation ; and a large collection of rough diamonds and gold recently discovered in a Brazilian river bed. Besides the above, there are eleven fine uncut rubies, weighing together 190 carats, from the newly acquired Burmese mines.

Gold Washing in Italy.—Washing for gold has been practised from time immemorial in Piedmont, in the beds of some of the torrents which flow from the Alps to the Po. According to Pliny and other ancient writers, upwards of five thousand persons were engaged in this occupation at one time. In modern times, however, it has only been practised on a small scale, and principally in the beds of the torrents Orco, Malene, Dora Baltea and Ticino. Of late years the existence of these auriferous sands has been more fully investigated, and they have been found to extend at the foot of the Alps from Legin and St. Maurizo on the west to the Dora Baltea on the east, and are bounded on the south by the Po, covering an area of 100,000 hectares, or about 250,000 acres. The depth of this gold-bearing deposit varies from five to eight metres, and although the amount of gold these sands contain cannot be said to have been ascertained with any degree of accuracy, there appears to be every reason to believe that the estimate of 0·40 grains per cubic metre is not an exaggerated one (0·01286 Troy ozs.) (0·2572 dwts.). A company, the "Società dei Giacimenti Auriferi di Piemonte," has recently commenced operations in the bed of the torrent Orco, near San Benigno, and a few weeks ago inaugurated a powerful steam dredger, named the "Regina Marghousa," which has been constructed especially for the excavation and washing of these sands, by M. Perrin, of Lyons ; it is of fifty horse-power and is capable of raising from 2,000 to 2,500 cubic metres of stuff per day of twenty-two hours. The buckets are twenty-two in number and are capable of excavation to a maximum depth of eight metres.—*Journal of the Society of Arts.*

Coral.—The value of coral depends on its colour and size. The white or rose-tinted variety stands highest in popular esteem, perhaps chiefly because it is the rarest. It is mostly found in the Straits of Messina, and on some parts of the coast of Africa and Sardinia. The bright red coral, in which the polyps are still living when it is fished up, comes next in value. Dead coral has a duller tint, and is consequently of less value. Two entirely different substances bear the name of black coral. One of them is not, properly speaking, coral at all, and is, commercially, worthless, as it breaks into flakes instead of yielding to the knife, though it is often sold as a costly curiosity to foreigners. The other is the common red coral which has undergone a sea change, probably through the decomposition of the living beings that once built and inhabited it. It is not much admired in Europe, but in India it commands high prices, so that large quantities of it are exported.

Mr. William Fowler has written a pamphlet for the Cobden Club on "The Appreciation of Gold," which will shortly be published.

Shellac.—In the Central Provinces of India, especially in the thick jungles, the *Coccus lacca* insects may be seen dwelling together in thick-set groups on the branches and twigs of *Zizyphus jujuba, Ficus religiosa, Butea frondosa,* besides other trees and shrubs belonging chiefly to the Leguminoseæ order. Each insect incrusts itself over with a resinous substance, forming within a cell containing larvæ and a deep colouring-matter, the dead body of the parent being itself the cell. Hundreds of these are piled together, adhering to a twig, and in this condition it is termed stick-lac, and contains about seventy per cent. of resin, ten per cent. of colouring matter, and the rest *débris.* The collecting of stick-lac and the making of shellac, button-lac, sheet-lac, and lac-dye is an industry carried on by the Hindoos in the districts of the Central Provinces. In order to obtain the largest quantity both of resin and colouring-matter, the stick-lac is collected before the larvæ emerge from the cells, else with their flight they carry away the greater part of the dye colouring. Since the advent of the aniline dyes, lac-dye is but little in demand. The larvæ are allowed to mature, as they do not interfere with the quality or quantity of the resin portion. It is chiefly this circumstance that keeps down the price of shellac, there being consequently more insect-workers than formerly.

The Black Forest Clock Manufacture.—The United States Consul at Kehl, Mr. Frank W. Ballou, has furnished his Government with a full report on the Black Forest Clockmaking Industry, in which he states that the value of the imports to the United States averages 50,000 dollars a year. He says that a great number of the clocks, however, are made only for sale, and warns the American travellers who, it seems, are great buyers of these goods, to be very particular as to when and of whom they purchase. The statistics given in the report show that the annual production has grown from 75,000 clocks in 1796 to 1,800,000 clocks in 1880. There are at present 92 communities engaged in the industry, with 1,429 independent clockmakers, giving employment to 7,526 operatives.

The Diamond Market.—*Amsterdam.*—No change is reported in this market, no business being done in *cut* goods excepting in the case of forced sales at low prices, while *rough* is scarce owing to the high prices ruling in the London market. In *Paris* the only business of any importance is being done with American buyers, although a change for the better is expected. A large number of big Cape stones continue to arrive at Plymouth, but from the difficulty of getting rid of them these are mostly broken up and cut into more saleable sizes. Two to five-carat stones are in most demand. The "Tartan" and "Moon" arrived during the month with large consignments. The *Kimberley* market remains dull, but prices are rather higher.

Silver.—The price of bar silver is 42¼d. per ounce, the market showing symptoms of a still further decline in the price. The Mexican dollar is 42d.

Trade Notes.

The old-established jewellery firm of Backes & Strauss has been turned into a limited liability company, under the style of Backes & Strauss, Limited, with a prospective capital of £100,000, in 20,000 shares of £5 each, the present issue being 17,000 shares, of which 5,000 fully-paid shares are allotted to the vendors in payment of the consideration for the purchase of the businesses to be transferred to the company. The reason for converting the businesses into a company is stated to be attributable to the desire of the two senior partners to retire from the firm in consequence of their advanced years. The bankers are the London and Westminster Bank, Limited, Lothbury, E.C. ; and the registered office of the company is at 64, Holborn Viaduct, E.C.

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The History and Object of Jewellery.

By John Jones, F.R.G.S., &c.

(Continued from page 38.)

THE buckles and clasps of which Homer speaks were probably ornamented with mythological subjects: specimens are, unfortunately, rare. The scarcity of the general objects of jewellery of which we complain seems recompensed by the number of their engraved rings which have escaped loss. The engraver's art enjoys comparatively little favour in this country. Painting gives freer scope for force of expression and fulness of composition, and deservedly receives more conspicuous help; yet, while exulting in the magical powers of Apelles, the Greeks were not forgetful of the more enduring nature of the works of Pyrgoteles. Eager for the fame of posterity, Alexander the Great forbade by an edict any other artist than the latter to engrave his likeness on precious stone. One of these gems became the property of the Roman Emperor Augustus, and may have been suggestive of, or auxiliary to, the patronage of art for which his era was illustrious. It is through an engraving on an emerald that we have the likeness of the Founder of our religion. It was taken by command of Tiberius Cæsar and became deposited in the treasury of Constantinople, whence it was given by the Emperor of the Turks to Pope Innocent VIII. as a ransom for his brother, then a prisoner to the Christians. Steel-plate copies of the gem are numerous. Not only have gem engravings been useful in determining facts in history or biography, but they have formed the school in which modern genius has been trained. Raphael is known to have been indebted to them for many graces of figure and expression which animate his productions. If posthumous fame be the just reward of great men, surely no more appropriate testimonials of esteem can be offered them than the execution of their likenesses on these imperishable substances. The oval form, as being that which bounds the range of vision, was used as the field on which their engravings were cut; and the principle by which their subjects were selected was the opportunity for showing some grace of person.

Under the voluptuous reign of Rome the primary uses of jewellery reappear, heightened by an application in which royalty still delights as one of its privileges. This conquering people gave civil laws to the whole known world, yet reflected in their domestic habits the characters of the nations they subdued. Their legions traversed the shores of the Persian Gulf and brought away the barbaric splendour of the Orientals as the trophies of their victories. The pearls of Persia, the rubies of Ava, the emeralds of Egypt, hung in unwieldy magnificence around the necks of Roman matrons, forcibly denoting the geography of the Roman dominions. The skill of the general seems to have been measured—if we may judge from the emphasis of their historians—by the natural resources of the conquered country in some of the esteemed luxuries of the age. Cæsar dedicated a shield of British pearls to the temple of Venus; and Pompey, returning from the subjugation of Mithridates, presented the jewel casket of the Persian king to the capital, and paraded a bust of himself, covered with pearls, in his triumphal procession. Nor had the vain pomp of wealth reached its meridian till a queen had outraged the uses of nature by swallowing a pearl of £5,000 value in a contest of extravagance with a Roman noble. Bangles jingled at the ankles of the ladies to give notice of their approach, that their servants might assume the attitude of respect; and, in the words of Pliny, the revenues of a lordship were absorbed in the simplest article of jewellery. No compromise of convenience for show disfigured the finger-rings of the Greeks; but an ounce weight of gold was the customary quantity in a single ring among the inhabitants of the Imperial city. When many rings were worn the burden must have been great, and well justified their habitual changes of size and weight to the changes of temperature. Their satirist, Martial, condemns the effeminacy of the custom, without noticing the offence against the modesty of good taste involved in the practice. The subjugation of every nation worthy of their ambition had left them no other object of pursuit than the gratification of their self-esteem. To such low service was jewellery subject, its once inspiriting uses were forgotten or neglected. Their early sovereign, Tarquinius Priscus, had used it as the reward of valour—giving to his son, but sixteen years of age, a gold pendant, to be worn round his neck, as a token of his courage in having killed a man in single fight. To this example we may trace the origin of those orders of knighthood which military men receive from their sovereigns as honorary tokens, and the possession of which is even now the boast of a modern noble. The custom has spread beyond the bounds of Christendom. A gold ring on the finger was the dignity reserved for the highest class of victors. The golden crown might be decreed while the ring was denied. The patricians of Rome traced their lineage to the foundation of the city, and, possessing riches and high spirit, threw a wide chasm between themselves and the plebeians—being insulted at the honours given to Flavius, a man of parts though of lowly parentage, in the 448th year of the city, they laid aside their gold rings, thus resigning that conventional honour which they felt had been violated, trusting themselves to their intrinsic worth for their position in society. With the republic this jealousy of honour died; and though the law forbidding a plebeian to wear a gold ring remained till the reforming times of Justinian, its spirit had long since gone: wealth had become omnipotent.

The philosophy and poetry of Greece were the models of Roman learning, and her great men, notwithstanding their love of country, gave due honour to their instructress. Such remains of that people as betoken an appreciation of art may be referred to their connection with the Greek colonies along the coast of Italy, which they successively subdued and engrafted on the empire. The name of the artist employed by Augustus to engrave a ring to be used as the Imperial seal was Dioscorides, a name evidently Greek. Emblematical figures of the subjugated countries were their favourite devices on their jewels. Pompey had a ring representing three parts of the world, in which he had conquered. The plentiful use of the acanthus in their ornaments shows splendour to have been their prevailing passion; the idea of fitness was lost in fondness for display. It is usual for historians to point to a love of luxury as the cause of a nation's fall, whereas it is from its deficiency that the dissolution of society arises. In the lower stages of progress personal decorations present attractions for the exercise of industry and present self-denial. The luxuries of one age are the necessaries of the next. For the maintenance of social health new objects of desire should be found, without omitting such as have become familiar.

Where indolence or tyranny has quenched invention among the people, the term of the state's existence is measured. Jewels, in their due places, are valuable stimulants, and deserve encouragement as means of civilisation, rather than contempt as signs of frivolity.

A new dynasty overran the shores of the Mediterranean, and the growth of Oriental grandeur received further encouragement. That firm apprehension of beauty of outline and proportion, which the study of the human form promotes, was denied to a people whose religion forbade the representation of animals. The human face especially had a determinate character: a hair's breadth divides similitude from caricature; a shadow distinguishes grief from joy; the portraiture of such differences must brace the powers of perception and execution. An abstract conception of human beauty was the deity which the Greeks worshipped. The confused crowd of their divinities were the models for exciting their delight; the artist outstripped the priest, and altars were raised to "unknown gods."

The Mohammedans, banded together on the truth of God's unity, overthrew polytheism and offered their adorations in mosques and palaces adorned with a bewildering complication of geometric figures and foliage; the vegetable kingdom supplied them with their decorations. Elegance and outline does indeed belong to flowers, but perfume and colour are their chief properties. The Saracens extended their conquests from Arabia along the north of Africa to Spain, where their caliphs became the principal patrons of art and learning for some centuries.

The colleges of Cordova and Madrid were the schools of Europe, and the gorgeous palace of the Alhambra became the model of a new style of architecture for Christendom, and has remained to this day the treasury of that class of ornaments named arabesques. In the elaborate tracery to be seen sculptured over the doorway of the cathedral at Rouen and other such buildings throughout the continent, the climax of this style of embellishment seems to have been reached. The entanglement of intermingling lines baffles the attempt to grasp the principle of the composition, yet both in detail and as a whole a pleasing impression is produced. The tombs of Cairo exhibit every form of combination of which right-lined figures are capable. The Saracens converted the right lines into curves, adding gracefulness to mathematical precision. The principle of Saracenic architecture was the construction in durable materials of an edifice similar to the Arab tent. A pole supported the centre, and richly worked shawls formed the curtains around it; every line in its structure therefore was graceful as the folds of drapery. Occasionally the Persian lattice-work appears in the groundwork of the walls, giving variety to the composition.

(To be continued.)

Birmingham News.

From Our Correspondent.

FROM north, south, east and west there appears to be no sign of a revival, and after careful and minute inquiries I regret to be unable to report any immediate prospect of renewed activity. The fact of a few isolated instances, where makers appear to be having a busy time, affords no ground for promising the public a speedy cessation of their troubles. There are always orders obtainable, but they are insufficient to provide the masses with employment and affect only a few; and, while being thankful for these small mercies and striving not to be envious of the fortunate recipients of them, we are in common duty bound to avoid exercising the harmful influence which false hopes are apt to create. Representatives of the best firms in town, among whom are some of the best men on the road, record their universal opinion as to the generalness of the depression, and state that they have the utmost difficulty in obtaining the most fragmentary orders, and that their greatest efforts are only sufficient to keep, in many instances, their staff of workpeople together. I heard the other day of a steady industrious workman being seen selling halfpenny toys at a race meeting. These facts speak for themselves, and unless the public taste for jewellery is very considerably increased, I fear that your correspondent's task will be destitute of that stimulus which business prosperity is calculated to create.

* * *

There is ground for hoping that the present Exhibition, embracing nearly all sections of the jewellery trade, will attract the attention of all the jewellers in the kingdom. There has never been such a lavish display of articles in gold and silver, we believe, in the country; the most expensive and costly work of art to the cheapest finger ring produced are exhibited for inspection, huge cases containing the combined samples of the most eminent manufacturers, who show not only the most beautiful work in filigree and enamel, as well as precious gems mounted with exquisite taste, but a spirit of emulation and a desire for great things, which is highly to be commended. We have only to mention Messrs. G. H. Johnstone & Co., H. Barber, and Goode & Son, with others whose names the Editor says he has no space to squeeze in, as a sufficient guarantee for the quality and variety of the display.

* * *

I am informed by a leading house in the Colonial trade that there are signs of a stir in the African market; they have traded there a long time and should be able to judge pretty correctly. Another large firm, whose name I am not at liberty to mention, has been doing a smart business with the Spaniards. Taking advantage of the recent arrival and addition to the responsibilities of the Royal House, an opportunity of displaying their patriotism has been provided them by the import of large numbers of gold, silver and bronze medals, bearing suitable inscriptions commemorative of the birth of the infant Prince: these have been rapidly taken up, and, for the sake of the makers, we trust the zeal of the purchasers will long continue. The same firm has also extensively manufactured ornaments descriptive of the Spanish national pastimes; these also are well received. The success is well deserved, and trade with the Spanish Peninsula would certainly rapidly increase if the same energy and business tact was more general amongst manufacturers. There is a great danger of makers accepting the present depression as a permanency. At no time is individual effort more necessary than in seasons of continued quiet; fresh fields must be sought and new markets established when the home demand is insufficient. I believe when Birmingham jewellers are roused to this fact, that then will come the better days we so anxiously wait for: the world is wide enough for workers in gold and silver as well as hardware.

* * *

Your readers will regret to see the report of the meeting of the creditors of Messrs. Atkins & Son, and of Mr. O. P. Martin (late Crozier & Martin), two old and well-known houses; they have the sympathy of all sections.

* * *

Silver was selling a day or two ago at 3s. $9\frac{11}{16}$d., a price I am assured it has not reached during the last twenty years. The gold chain trade is almost *nil;* plated goods, similar to those manufactured by Messrs. N. C. Reading & Co., which stand any test and show the same colour all through, answer the purpose of ordinary buyers. I hear of two firms, which not long ago employed thirty or forty men each, now being reduced to ten men between them. Rings continue in good demand, and makers who lay themselves out specially for keepers are kept fairly employed. The request for fine gold bracelets is also continued. Whatever the current opinion respecting the silver jewellery trade may be, I decidedly believe that it has a long career: formerly it was in the hands of a few makers only, now it is distributed amongst many, and the fact that within the last six years the Birmingham Assay Office business has quadrupled, in this particular, confirms me in my impression that the demand will continue to increase.

* * *

The Birmingham watch factories are still doing very little, but hold themselves in readiness for active operations. No finer machine-made timepieces are produced anywhere than those manufactured by our two well-known houses, and the exhibit of the English Watch Company at the forthcoming Exhibition will prove to all interested persons the fact, that the Americans are not one whit before them either in machinery or quality of work. In the shape of orders no good things are about, although there are hopes of a speedy revival; of one thing we feel sure, and that is the confidence, rapidly growing, our Colonial friends have in the manufactures of the toy shop. There is no more legitimate market, and when the somewhat monopolised trade finds freer channels, the Colonial public will provide abundance of labour for our willing workmen.

* * *

Coventry watchmakers are in an apparently hopeless state of despondency, although I hear of two houses having received a new lease of life. Let us hope they will become more general; there is no doubt about their scarcity, and many manufacturers here are in great straits. Cheap goods, as worthless as cheap, continue to rule the market; presently the apparently natural gullibility of John Bull will cease in this respect, and a return of discretion will arrive when he has discovered the folly of purchasing stop-gap articles instead of life timers.

* * *

British Association for the Advancement of Science.—Birmingham meeting, 1886.—Exhibition of Local Manufactures and Natural History in Bingley Hall.—On each occasion when the British Association has visited Birmingham there has been an Exhibition of local manufactures. The first was held in 1839, and was so successful that it was extended considerably beyond the time first decided upon. In 1849 an Exhibition on a much larger scale and in a specially erected building was held; this was visited by H.R.H. Prince Consort and was useful to him in carrying out the idea of the International Exhibition of 1851, and now that the British Association for the fourth time are visiting Birmingham, they have as comprehensive a display of the articles manufactured in Birmingham and in the district embraced by a radius of fifteen miles as it is possible to gather together. A special feature of the Exhibition is the introduction of workshops illustrative of old Birmingham architecture, wherein quaint and interesting trades are being carried on.

The Exhibition is divided into two divisions, viz., Manufactures and Natural History. In the first under

Class A.—Engineering is represented by a show of prime movers and means of transmitting power, machines, metal and wood working, hydraulic, constructional engineering, railway plant, cycles, &c., &c.
Class B.—Hardware. *Electro-plate and White Metal*, and a variety of other goods from art metal work to keys and pins.
Class C.—Heating and lighting.
Class D.—Arms and ammunition.
Class E.—Div. 1: *Jewellery*. Div. 2: *Gold beating and goldsmiths' work*. Div. 3: *Silversmiths' work*. Div. 4: *Clocks and watches*.
Class F.—Glass and Pottery: includes table glass, optical glass, artificial eyes, &c., &c.
Class G.—Stationery: includes papier-maché and fancy boxes.
Class H.—Leather.
Class I.—Furniture and decoration.
Class K.—Animal and vegetable substances: includes *ivory, horn, bone and tortoiseshell*.
Class L.—Chemicals.
Class M.—Miscellaneous: scientific and *musical instruments*.
Div. 2.—Natural History.
Class A.—Zoology.
Class B.—Botany.
Class C.—Geology.

The foregoing details will serve to show your readers the wide range of the Exhibition. Many of the sections possess great attractions for the scientist and professional man, and I regret that owing to the unfortunate arrangement with regard to the date of opening, I am unable to give those branches of trades we are interested in the attention I should like, but trust in your next issue to deal *specially* with Class E and part of Class B, these being full of instruction and of peculiar interest to your readers.

Diamond Cutting.

It is not generally known that the operations of diamond cutting and polishing seen daily at the Colonial and Indian Exhibition represent a new home industry as well as a novel process. Until recently, the shrewd Amsterdam artificers had a monopoly of the calling, and, if all accounts be correct, a very good thing they made of the diamonds entrusted to their care. Messrs. Ford & Wright, of Clerkenwell, are the first English firm adopting the business of diamond cutting and polishing; and their establishment is owing to the invention about three years ago, by Sir H. Bessemer, of machinery which gives the English cutters a considerable advantage, in many respects, over the Dutch workers. All the processes of diamond washing, cutting and polishing were specially shown recently to the Master Wardens and Court of Assistants of the Worshipful Company of Turners, to meet whom the Baroness Burdett-Coutts, the Lord Mayor and others were invited. Mr. Burdett-Coutts was present by virtue of his association with the old City guild, in which he is renter-warden. Some years ago the late Professor Tennant and Mr. John Jones, a past master of the company, drew the attention of the Worshipful Turners to the possible restoration of the art of diamond cutting and polishing by Englishmen, and the company, with the generous assistance of the Baroness and Mr. Burdett-Coutts, interested themselves in the revival—amongst other methods by offering prizes for competition. At that time there were only four persons in this country known to be pursuing the calling of diamond cutters; now, as we have stated, there is a thriving firm engaged in the business, employing forty skilled men; and it is acknowledged by all competent critics that diamonds are being cut in the finest possible manner by English workmen. The invitations sent out by Messrs. Ford & Wright were intended to be in some degree a recognition of the encouragement thus given by the Turners' Company and the Baroness and Mr. Burdett-Coutts. The manner in which the "blue ground" is dug out of the diamond mines, broken up with picks, exposed to the air until it becomes soft, and washed until the earth has disappeared, leaving the rough diamonds at the bottom, together with the perfection of the cutting and polishing machinery erected in the Exhibition, has been already described by us. The working, conducted publicly twice a day, has become one of the recognised sights of the Exhibition. It takes place in the very interesting Cape of Good Hope Court, and of course Sir Charles Mills, the Agent-General and Head Commissioner, was included on the recent special occasion amongst the honoured guests.

The Cape Commission have spent large sums of money and gone to a vast amount of trouble to make this feature the marked success it has been from the outset. They show how a diamond is produced by the successive stages of mining, washing, sorting, cutting and polishing, and the raw material, or "blue ground" as it is technically termed, comes from the four principal mines, Kimberley, De Beers, Dutoitspan and Bultfontein. Working models of all kinds of machinery and excellent models on scale of an entire mine (Bultfontein, Griqualand West) are exhibited in the centre of the Cape Court. From this mine during last year two million loads approximately of diamondiferous ground were hauled, yielding about 500,000 carats of diamonds, valued at over half-a-million sterling. The deepest workings in this particular mine have reached a depth of nearly 300 feet from the surface. The earliest diamonds probably came from India, and it is said that the history of the famous Koh-i-noor is celebrated in one of the songs of the Vedas as having formed part of the treasures of an old Indian chief, probably 5,000 years ago. The opening of the Brazilian mines at the beginning of the last century practically closed the mines of the Deccan, and now Brazil has in its turn been eclipsed by the diamond fields of South Africa. Diamonds in small quantities have been found in Sumatra and Celebes, but in the Eastern Archipelago Borneo is fullest of promise in the commerce of brilliants. One of the largest diamonds in the world, a pure white stone of 367 carats, was found in that island, and in its uncut state still belongs to the Rajah of Matam.

Many geologists in Australia cherish the faith that diamond mines will yet be added to the sources of wealth of that developing land of surprises. Accidentally discovered by a travelling trader not quite twenty years ago, the South African mines, which are 500 miles from the coast, and at an elevation of 4,000 feet above the sea, are, however, at present unrivalled in their size and value. The romantic hardships which toughened and roughened the early diggers have largely disappeared before the railway communication which brings the fields within a thirty hours' journey of the coast. The business is now transacted on scientific principles and a regular system. There have been, as might be expected, alternations of profit and loss, but the returns of the four principal mines show that in the three years and a third previous to the end of 1885 there was a total production of over eight-and-a-half millions sterling. A Kimberley diamond was recently shown in London valued at £100,000. It weighed more than four hundred carats in the rough, and is, we believe, now in the possession of Streeter & Co., the well-known jewellers. The finest diamond in quality ever found in South Africa was the "Porter Rhodes," discovered in the centre of Kimberley Mine in 1880. It is a pure white octahedron, valued at £60,000.—*Daily News*.

Paris Notes.

From Our Correspondent.

Paris, *August 16th*, 1886.

PASSING down the Rue Saint Honoré yesterday, I noticed in the window of M. C. Bussienne, proprietor of the *Horlogerie de l'Oratoire*, at No. 150 in that street, a very neat, tasteful and original show of jewellery made entirely out of the works of old watches. The wheel-like open trellis-work piece which protects the mainspring in old and useless watches, and which the French call *le coq* (the cock), had been made up into earrings, brooches, necklaces, heads for hairpins, gentlemen's scarf pins, bracelets, clasps for mantles, and every other imaginable article of jewellery. It looked exceedingly well, and sufficiently rococco to suit the ruling fancy of the moment in Paris. The *coq* is made of brass, and heavily plated with gold for its new ornamental purpose. Exquisitely worked in open work as seen in old watches, it reminds one of the filigrane jewellery so marvellously made by the craftsmen of ancient Egypt. The collection of this original jewellery was exhibited in the inventor and proprietor's window on a shield of velvet. Something to be appreciated in these days, when real novelties are very difficult indeed to find.

* * *

It is a curious fact that in the slang or *argot* of Paris, the word *bijoutier*, which really means a jeweller, is used to designate the industrial who buys scraps from the kitchens of the big restaurants and retails them in the popular markets.

* * *

A few days ago was solemnly held, in the large hall of the Palace of the Trocadero, the festival of the distribution of prizes to the scholars of the Paris School of Watchmaking. This school, now a most important concern, was founded in 1880, and received recognition and a legal establishment from the French Government three years later. Since this date some 119 scholars have received technical instruction in the difficult and exquisite art of watchmaking, and very good fruits have in many manifested themselves, especially in that most difficult branch of the art, marine chronometry. The courses at this school are open to all, and liberal scholarships are offered each year, so that even the poorest have the opportunity of benefiting by the instruction given. So useful to French trade has this institution proved itself to be, that it is decided to erect a large new building for its accommodation, the cost of which will be covered by public subscription, already opened and most liberally responded to. The site of the new school is in the Rue Manin. The buildings, which will cover a surface of 1,150 metres, will, it is anticipated, be finished in 1888, on the eve of the great Exhibition.

* * *

The festival was a most successful one. The huge hall was completely filled with an appreciative and enthusiastic crowd, who listened with marked attention to the speeches of M. Rodanet, Director of the School, and of M. de Hérédia, deputy, who attended to represent M. Lockroy, the Minister of Commerce, who was absent at Lyons. M. Rodanet gave a most interesting account of the history of the institution under his care, while M. de Hérédia pointed out the benefits that accrued to the country from such institutions. The distribution of prizes, offered by the Managers of the School and by the Paris Syndical Chamber of Watchmakers, was then proceeded to. A silver medal, offered in the name of the Minister of Commerce, was presented to M. Brémant, the principal instructor, and two bronze medals from the same source were allotted to the scholars Trébin and Coutunier. The grand prizes of the Syndical Chamber, consisting of two gold medals, worth £12 (300 fcs.) each, were given to two other scholars whose names escaped me. Other medals, mentions, &c., having been distributed, a splendid chronometer, constructed by the scholars, was offered to M. de Hérédia, the chairman of the meeting. The proceedings were brought to a close by the performance of a selection of music by the excellent choral society, the *Abeille*.

* * *

In a previous letter I briefly alluded to the workings of the French Governmental Pawnbroking Establishment, or Mont-de-Piété. It is on the customers of this mournful financial institution that hundreds of the less reputable jewellers in Paris fatten. Many buy the pawntickets at scandalously low rates from their unfortunate holders, redeem the pledges, and thus provide themselves with a stock of jewellery which costs them but a trifle over two-thirds of the value of the precious metals contained in each article. For be it noted that the Mont-de-Piété, in advancing money on jewellery, merely calculates the value of the metal the offered pledge may contain, the workmanship counting for absolutely nothing. Thus the finest chronometer ever turned out, fitted in a brass or nickel case, would fetch infinitely less than the commonest Geneva watch in a gold case.

* * *

This apparently beneficial and convenient system usually covers the vilest form of usury— of usury always to be condemned, but utterly despicable when its victims are chosen from amongst the poorest and most forlorn. The plan is nothing more or less than to extract from the seller, anxious not to lose the voucher of his pledge, a monthly interest of 10 per cent., or considerably over 200 per cent. per annum, on the amount first lent. This amount varies between the third and fifth part of the sum lent on the pledge by the Mont-de-Piété and inscribed on the ticket. Thus on the ticket of a watch pawned for 40 fcs., the holder could procure about 10 fcs. from one of those jewellers over whose shop appears the ill-reputed sign of *Achat et Vente de Reconnaissances du Mont-de-Piété*. In exchange for his ticket the pawner would accordingly receive the sum of 9 fcs., or 10 fcs. minus 10 per cent. interest. If at the end of thirty days he is anxious of re-entering into possession of his pledge he can only do so by paying 10 fcs. But supposing that at the end of these thirty days he is without the funds necessary for this re-purchase, his only means of protecting himself against the final loss of his pledge is to pay the interest, when a fresh delay of thirty days is accorded him. At the end of this second month he will have to pay a further sum of 1 fc. in addition to the amount received, or another franc for a further delay. And so on until he is able to withdraw his pledge. I am very glad to see that the police authorities are waging a pitiless war against these petty Shylocks of the faubourg, whose eventual extermination seems to be of no distant date. During the sitting of the Eighth Chamber of Correctional Police a day or two ago, I saw no less than four of these usurers put on trial and sentenced. The lowest penalty inflicted was a fine of £40 and costs, accompanied with a sentence of three months' imprisonment, loss of civil rights, and publication of the sentence. In these cases, at any rate, the French courts do not show that leniency with which they are so often reproached.

* * *

The taste for ancient furniture which, abandoned by the upper ten, has now descended to the middle classes, has set a premium on those old cottage clocks of the type which was sung in a sentimental song immensely popular a few years ago. The farmhouses of Brittany and Normandy have been ransacked by the dealers in antique furniture, and the market flooded with Grandfather's clocks in more or less advanced stages of decay. Some of these are really fine works of art, both as regards the case and the works, and for these a very high price is asked. One which I recently inspected in a shop in the Rue de Bellechasse, and which was cased in walnutwood and copper inlaid work, was priced at 1,000 fcs., or £40. It was stated to be two hundred years old, and the works were said to be in excellent order. The commoner and less ancient qualities are proportionately as dear, 400 fcs., or £16, being the general price for goods which with a little bargaining one can pick up for from 25s. to 40s. in any Norman or Brittany farm-house. For the French peasant looks on them as cumbersome and out of date, and is very happy to replace them with a mantelpiece *pendule*.

APPLICATIONS FOR LETTERS PATENT.

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, and 6, Lord Street, Liverpool.

9.428. P. A. Newton, a communication from T. Gribi, United States, for "Improved means for poising balance springs of watches and clocks." Dated 20th July, 1886.

9,430. W. W. Jones, Manchester, for "Improvements in the articles called studs and solitaires and employed for fastening collars, shirts, cuffs and other articles of dress, and for other analogous purposes." Dated 20th July, 1886.

9,464. R. Hemsley, London, for "Improved means of temporarily holding or mounting diamonds and other gems." Dated 21st July, 1886.

9,486. L. Grabau, London, for "Improvements relating to the production of aluminium and alloys thereof." Dated 22nd July, 1886.

9,498. F. T. Brown, Liverpool, for "Electric alarm clocks." Dated 22nd July, 1886.

9,599. J. Gerhardt, London, for "An improved pendulum compensation." (Complete specification.) Dated 24th July, 1886.

9,878. J. Brodie, Leeds, for "Improvements in watch glasses and watch cases." Dated 31st July, 1886.

9,929. A. Welter, London, for "An improved centre seconds watch." (Complete specification.) Dated 3rd August, 1886.

9,986. A. Ramel and W. W. Dean, London, for "Improvements in clock synchronizing apparatus." (Complete specification.) Dated 4th August, 1886.

10,024. W. Johnson, Liverpool, for "Improvements in the method of securing scarf pins, shawl pins and other like articles." Dated 5th August, 1886.

10.131. H. Dalgety, Catford, for "Improvements in studs, solitaires and such like articles." Dated 9th August, 1886.

10,412. F. R. Baker, Birmingham, for "A new or improved fastener for cuffs, wristbands, collars, waistbands and other articles of dress, jewellery and the like." Dated 14th August, 1886.

10,413. J. Herrmann, Dulwich, for "An improved keyless mechanism for fusee watches or chronometers." Dated 14th August, 1886.

10,477. W. A. Thoms, London, for "Improvements in the deposition of platinum by electricity." Dated 16th August, 1886.

Correspondence.

All Letters for Publication to be addressed to the EDITOR *of* THE WATCHMAKER, JEWELLER AND SILVERSMITH, *Imperial Buildings, Ludgate Circus, E.C.*

All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.

THE PRESENT CONDITION OF THE ENGLISH WATCH TRADE.

To THE EDITOR OF *The Watchmaker, Jeweller and Silversmith.*

SIR,—I was quite disappointed there was no further contribution to the above subject, so ably introduced by Mr. D. Glasgow in your July number. Firstly, as regards the "horrid" hall-mark, a great deal more may be said before that subject is thoroughly hammered out. Take the *bonâ fide* provincial watch and jewellery dealers, I believe ninety-nine out of every hundred are opposed to it abolition, because, among other reasons, it frequently happens that intending purchasers of a new article, a watch or jewellery as the case may be, will ask the shopkeeper what he can allow for some old watch, &c., they wish to part with as part of the exchange, and as a matter of course if the articles are hall-marked the dealer knows directly what he can allow for them to be on the safe side of the bargain. Now, Sir, in reference to the trade meeting at the British Horological Institute some time ago, with the object of preventing foreign-made cases being hall-marked in this country, and which said meeting were all at sixes and sevens so far as any united action could be taken, was much to be regretted; nevertheless I do not see why the movement should die out without another attempt. It is believed by many in the trade that numbers of foreign watches are sold to the public as of English make, although I doubt if it is done in the provinces to a great extent. I have only met with two instances where such was the case: one was a gold watch bought at a first-class shop and the other a silver one. In the latter case it happened I was in a jeweller's shop, on business purposes intent, in one of our northern ports, when a dock labourer came in bringing with him a watch he purchased the day before. (He was also accompanied by his mate or fellow labourer as a witness.) The man pulled the watch out of his pocket and handed it across the counter, saying, "Here, Sir, I've brought this watch back; it won't go at all and it ain't an English watch." The shopkeeper held it up and, looking the poor man sternly in the face, exclaimed, "Why, mein Got, you can't expect a new vatch to go like an old von as is used to it—'t ain't likely—you must vind it and shake it and it will come all right." I quickly made my exit from the scene, thinking the force of impudence could no further go. Well, Sir, pardoning this digression, I will suggest a plan which I trust may meet the approval of those who would be willing to take action to mitigate the evil of foreign watches being foisted on the English public. Let an association be formed, to be called the English Watch Trade Protection Association, and a committee appointed from among the London and provincial watch manufacturers, with the object of periodically advertising in some of the principal London daily and provincial newspapers, stating it is believed foreign watches are largely sold as English ones to the detriment of the home trade; and also apprising the public that most of the foreign gold ladies' watches have silver-gilt dials on them, and to ask the tradesman for an English watch if they desire one, and also to have a written or printed guarantee from the seller that it is an English-made watch. I cannot think there need be much trouble and expense in carrying out some simple plan of this kind, considering the great interests at stake. Trusting to see some further discussion on the subject that may result in some benefit to our trade, Obediently yours,

"TRAVELLER."

PHOSPHOR BRONZE.

To THE EDITOR OF *The Watchmaker, Jeweller and Silversmith.*

SIR,—I have taken the advantage of your well-circulated and valuable paper, to see if any of your many readers can give me any information of the component parts of the above metal. I have had some pieces to roll or flatten, each of which are from 50 to 60 lbs. in weight and about $1\frac{1}{4}$ inches thick; but I find the tenacity of the metal so great that with a pressure between the rolls of 80 to 100 tons it will hardly reduce it in substance. It appears, after the application of heavy pressure, to be like indiarubber; it does not barely reduce, and the pressure is so great to move it at all that I am afraid of our gearing being broken. We have some roll bearings made of it in casting, and they wear wonderfully well, and answer the purpose equal to any bearing I have tried. If any of your readers have had the opportunity of using it, perhaps they might reply to let us know if it can be forged or rolled while it is hot from being annealed in the same way as iron. Yours, &c., GEORGE HICKMAN.

Rolling Mills, Gloucester Street, E.C.

Buyers' Guide.

The Sheffield Smelting Company, Sheffield, *Sell* Gold and Silver (pure and alloyed). *Buy* all materials containing Gold and Silver.

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The

Watchmaker, Jeweller and Silversmith.

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The Watchmaker, Jeweller and Silversmith.

A Monthly Journal devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

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Editorial.

THE address of the President of the Institution of Mechanical Engineers is always looked upon as an event of great interest and importance in mechanical and scientific circles throughout the community, and, from the high position he occupies, any remarks coming from him are invested with an authority they may not otherwise essentially possess.

It is a curious, but undeniable and lamentable fact, that when scientists generally meddle with the details (and to them, apparently, the mysteries) of watchmaking, they almost invariably become involved and make blundering statements of the most misleading kind, which make their sources of information appear utterly unaccountable to practical men.

The speech of Jeremiah Head, Esq., at the recent summer meeting of the above institution, is a case in point. While he confined himself to the economy of mechanical engineering and the questions connected with it generally, he was well within himself, and his remarks were eloquently pertinent; but as soon as he entered into the particulars of watchmaking, his want of knowledge of the subject was at once apparent.

Without discussing the whole speech, to most of the implications and inferences of which we take exception, it will be sufficient for our purpose to give one or two samples of it. In speaking of the establishment of watchmaking in America—the facts about which he seems to have derived from the paper recently read by Dr. Waldo before the Society of Arts—he says: "They found they might safely abandon the complication caused by the fusee and chain, if for the ordinary mainspring they substituted one of gradually increasing section, so that it should exert the same force, or nearly so, when almost unwound as when fully wound up." Here are two errors: the one attributing to the Americans the original introduction of the going-barrel, and the other the employment of the tapered mainspring, which every watchmaker knows can only be successfully employed with the fusee adjustment, as it would have the reverse effect of equalising the power if tapered towards the centre, and, if tapered the other way, it would scarcely act at all, owing to the excessive friction caused by the coils rubbing one another.

After unfavourably contrasting the English system of production with the methods employed by foreigners, and praising the factory system and the use of automatic machinery, he goes on to speak of having purchased "a substantial new silver watch in a highly-finished case, guaranteed to contain 80 per cent. of metallic silver. The escapement was of the Geneva pattern, the works were electro gilt, and looked as good as those of an ordinary watch, &c., &c., which neither gained or lost a minute during a fortnight, and which cost only 18s. 6d." Evidently not a machine-made watch at all, but a Swiss watch of the commonest type, with a horizontal or cylinder escapement. As to the works looking the same to Mr. Head as those of an ordinary watch, probably he would not be able to see any difference between a watch of the highest possible finish and one of the lowest, unless pointed out to him.

The whole of that part of the address having reference to the production of watches, which shows a complete absence of the most elementary knowledge of the subject, is calculated to have a most injurious effect on the English watch trade: and what we emphatically protest against is, the continuance of such misleading and pernicious public teaching from gentlemen occupying such an influential position as the President of the Institution of Mechanical Engineers. It is to be hoped that any of the minor prophets who may wish to hold forth on the same lines will better inform themselves beforehand, and not, at all events, base their text on the gospel according to Jeremiah.

The meeting—of which we have the pleasure of giving a report on another page—on the question of the Hall-marking of foreign watch cases, is the most important which has yet been held on the subject—from the fact of the unanimity of opinion which prevailed among those attending it: of its thoroughly representative character; and that the gentlemen on the platform, who were of distinctly different shades of politics, did not make it a party question, but stuck to the point at issue.

The resolutions put and carried were of a very harmless nature, and did not clearly indicate the kind of Act of Parliament that would meet the difficulty. This, however, it is not so easy to do as at first sight appears; and the fact of there being no objectionable features in the resolutions is a progressive improvement that will doubtlessly induce most of those who formerly opposed Sir Henry Jackson's bills to co-operate in the present movement.

The question before us is one which affects the whole trade: and it is to be hoped that the agitation now going forward will be continued until it is satisfactorily settled.

The article on Electric Clocks will be continued in our next month's issue.

General Notes.

Owing to the great importance to our readers of the Birmingham Exhibition, the present number of *The Watchmaker, Jeweller and Silversmith* has been enlarged four pages, in order to admit of a special and full report.

In the House of Commons on the 21st ult., Baron H. de Worms, in reply to Captain Penton, said he could not give any undertaking with regard to legislation for removing the grievances from which the watch-case makers complained they were suffering. The subject would, however, receive the consideration of the Board of Trade during the recess.

On the 19th ult., Mr. E. Stanhope, in answer to Sir Richard Temple, said that no official report had been received of recent discoveries of gold in Queensland. The gold field in that colony was at a long distance from the coast.

The British Association.—The labours of the British Association at Birmingham came to a successful conclusion on 8th September. From the report submitted, it appears that altogether 2,328 tickets were issued during the meeting. At the general committee meeting, grants for scientific purposes for the year were made amounting to £1,300. It was resolved to petition Her Majesty's Government to urge the Egyptian Government to preserve the mummies recently brought to light, and it was recommended to approach the owner of Stonehenge with a view to its better preservation. The founding of geographical chairs at our universities was also recommended.

According to *Kemp's Mercantile Gazette*, the number of failures in England and Wales gazetted during the four weeks ending Saturday, 28th August, was 365. The number in the corresponding four weeks of last year was 326, showing an increase of 39, being a net increase, in 1886, to date, of 235.

Among the curiosities shown at the Colonial Exhibition is one especially interesting to ladies in search of novelties. This is the coral-leaf, which has been recommended to attention by the English Consul at the Bahamas, as a valuable discovery for millinery purposes. It is lighter than jet in weight, it can be died any shade or bleached the purest white, and, being of a very pliable nature, is said to twist into the most perfect and artistic specimens of hats and bonnets.

A Mayoress's Chain.—The Mayor of Liverpool on 1st September presented to the City Council a valuable gold chain with an enamelled portrait of the Queen, to be worn by future mayoresses of the city.

A casket of jewels was on Wednesday, 8th September, dispersed by auction at Debenham, Storr & Sons' rooms, in Covent Garden. Amongst the more important lots were lot 1168, a brilliant necklace, 93 guineas; 1169, a brilliant tiara, 41 guineas; 1170, a brilliant bracelet, 73 guineas; 1175, a costly gold keyless minute repeater, set with brilliants, 126 guineas; a pair of pearl and brilliant eardrops, 75 guineas; 1177, a brilliant spray ornament, 90 guineas; a turquoise necklette, 39 guineas; 1176, a bracelet set with cat's-eyes and brilliants, 57 guineas; 1180, a gold purse enriched with brilliants, 150 guineas; 1181, a butterfly brooch, 100 guineas; 1182, a bracelet of brilliants, 185 guineas; 1183, a brilliant shell pendant, 115 guineas; 1184, a half-hoop brilliant bracelet, 110 guineas; a pair of brilliants, 180 guineas; 1186, a half-hoop brilliant ring, 82 guineas; 1187, a brilliant and pearl swan pendant, 82 guineas; 1188, 5 gold bracelets, 50 guineas; 1189, a gold and brilliant bracelet, 155 guineas; 1190, a brilliant and sapphire half-hoop bracelet, 110 guineas; 1192, a sapphire and brilliant half-hoop ring, 70 guineas; 1194, a half-hoop sapphire ring, 32 guineas; 1195, a half-hoop brilliant ring, 75 guineas; 1196, a brilliant marquise ring, 25 guineas.—*P. B. Gazette.*

Now that there is so much demand for elaborate slides for ladies' fancy boots, would it not be worth the while of our Birmingham jewellery manufacturers to give the production of these goods increased attention? Speaking the other day to a large importer of slides and ornaments for bows, he assured us that the bulk of the articles he supplied had to be bought in Paris; and this not because the French goods were either better or cheaper, but because the Birmingham jewellers would not go to the trouble to alter or modify their designs to the requirements of the boot trade. We recommend this to the attention of our Birmingham friends. The extent of the trade is much greater than they imagine, and the fashion for shoe ornaments is distinctly on the increase.—*Shoe and Leather Record.*

Rubies.—It is stated that Professor Friedel, of the French Institute, has addressed a report to the Association of Jewellers and Diamond Merchants in Paris on artificial rubies. He found the chemical composition, density, fusibility, crystalline form and refractive power of the artificial specimens handed to him for examination to correspond in every respect with the qualities of the natural ruby. Both kinds contain alike tiny air bubbles; but while the cavities in the genuine rubies are almost invariably polymetric, with surfaces parallel to the planes of cleavage, those in the artificial specimens examined by Professor Friedel had curved surfaces, frequently of a pear-like form. Moreover, all these pear-shaped bubbles in any given portion of the artificial ruby had their elongated axes running in the same direction. From this Professor Friedel infers that the material out of which the artificial rubies are made was originally of a pasty consistency, and the bubbles of gas striving to escape gave their prison cavities this pear-like form. In consequence of this technical report, the association decided that artificial rubies could not be regarded as precious stones, and any one selling them as such would be guilty of fraud.

The Jewellery Exhibit at Birmingham draws large numbers of visitors, and many inquiries are made respecting goods. It should have the effect of stimulating trade to a large extent. Some of the factors are beginning to fear damage to their business in consequence of the publicity which manufacturers are obtaining, and the increasing tendency on the part of shopkeepers to deal directly with them.

The heart of the late King of Bavaria has been deposited with great pomp and solemnity at Renotting, where the hearts of all the kings of that country for many years are preserved. It was enclosed in a costly silver urn, the Requiem being attended by thousands of the populace.

The Diamond Market.—Notwithstanding the high prices which are ruling at *Kimberley*, the reports from all quarters indicate a marked improvement in the diamond trade. In *Amsterdam* there is a steady demand for both *cut* and *rough* goods, while at *Paris* a fair amount of business is being done, although perhaps not so much as there would have been were there not so many people out of town, owing to the intense heat lately prevailing. The *London* market has shared the common revival and business has been active generally. The steamers "Norham Castle," "Prætoria" and "Hawarden Castle" arrived during the month.

Silver.—The market somewhat recovered during the previous month, the price of bar silver remaining pretty steady at 44d. per ounce.

The Hall-marking of Foreign Watch Cases.

A LARGELY attended meeting of representatives of all branches of the watch trade was held in the schoolroom of the Martyrs' Memorial Church, St. John Street Road, on Monday evening, 13th September, to consider and adopt the best means for preventing the English Hall-mark being placed on foreign watch cases. Captain Penton, M.P. for Central Finsbury, presided, and was supported by Mr. James Rowlands, M.P. for East Finsbury, Sir A. K. Rollit, M.P. for South Islington, Mr. Saul Isaac, the Rev. C. J. Oliphant, Mr. MacFarlane, and others.

The Chairman in opening the proceedings briefly stated the object of the meeting. He said that it was not for him to tell them how they should remedy their grievance. He had come there with the object of eliciting what they considered the best means for doing so. This subject had been before Parliament for perhaps ten years, and the more he had considered the subject the more he had come to the conclusion that why Parliament had not seen its way to do anything was that the members of the trade had not been of one mind. He felt quite sure that if they would only make up their minds and all the branches of the trade speak with a unanimous voice, Parliament would not be slow to protect them. (Cheers.) He quite agreed that the remedying of this matter was a very important object to keep in view, but at the same time it was not necessary for him to decide whether the provision of Hall-marks being placed upon watches would remedy much the depression in trade which they so much deplored. He thought at the same time that other means would have to be taken. He would say, however, that it would be necessary to alter the law so that a distinctive mark should be placed upon foreign-made watches and movements. He would suggest that anyone sending a watch case or watch movement to be Hall-marked should make a statutory declaration as to the place where it was made. He was much astonished that the trade did not possess a trade protection society, and he would suggest that one should be formed, and one of its principal duties would, of course, be to see that their grievance should be redressed. He thought also something was wanted of the nature of co-operation, and if that were properly carried out, it would probably do more for them and their trade than any Act of Parliament. Whatever the restriction of Hall-marking to English watches might do to alleviate the depression in trade, at any rate it would satisfy the members of the trade that they had a fair field and no favour. (Cheers.)

Mr. MacFarlane moved, "That, in the opinion of this meeting, the English Hall-marking of foreign watch cases having caused a great loss and serious injury to the watch trade, the Government be asked to bring in a short bill with a view to remedying this evil," and said that they did not complain of fair competition in their trade, but they objected to foreigners coming over here and working upon the English reputation.

Mr. Sutton seconded the resolution.

Mr. Rowlands, M.P., in supporting the resolution, thought that there was still some life in their trade. (Cheers.) The great fault was that they had never gone to the Legislature with a united voice, and unless they did so it was impossible for any Parliament to deal with the question. He would urge them, as a practical watchmaker, not to be turned aside from this matter by any side issue. As far as he remembered, instead of acting on a common platform and with a common voice, in the past, they had each had some little crotchet which they naturally thought most important. He considered this subject as totally apart from free trade or fair trade; it was simply one of trade marks. His opinion was, from his experience, that any person, if he liked, could gull the public with any watch with an English Hall-mark. He advised them to go on as they had in the past, and what they ought to be prepared to do was to pass the resolution and form themselves into a committee and carry on the agitation. It was too late in the present session to call any attention to the question, but early in the next session he hoped that they would be able to give time to it. (Cheers.)

Sir A. ROLLIT, M.P., in supporting the resolution, promised to do all he could in this matter. They did not mind inequality, as he took it, it was England against the world. (Cheers.) There was one great characteristic about English workmanship, it was downright solid and good. In fact, they put their character into their work, and the Hall-mark was a mark of value, and it was totally unfair that the foreigner should have the advantage of that trade mark. To them as Englishmen it mattered whether a watch was made at Birmingham, London or Geneva. He would tell them the difference between goods made here and goods made abroad. Goods made here meant happy homes and a prosperous country, and if it mattered not whether they were made at home or abroad then good-bye to British trade. (Cheers.) That the Hall-mark was imitated by the foreigner was a proof that it had a value, and it was a dishonesty which the British workmen could not contend with. Let them have free trade by all means, but let them have fair trade at the same time. It was a fraud upon the British public, and every foreign watch which was bought with the understanding that it was English was so many British hands out of work. He would say that when depression in trade was at the right of them and at the left of them and all round them, it was time for the working classes, and all classes, and the masses too, to consider what means should be adopted to keep the trade in their hands and their homes together. If they could show that it was not a case of two of the trade never agreeing, but that two thousand of a trade were all of one mind, then he and his fellow members would do all in their power to remedy this matter. He thought that if the foreigner required a Hall-mark he should have a Hall-mark of his own, and if they were going to have a Hall-mark of their own, let it be one which would not be confounded with the old trade mark, so that the British public might know that if they bought foreign goods they were buying them with all their faults and with all their frauds too. (Cheers.)

Mr. WALTON advocated the stamping of foreign watch works with the name of the place where they were made. This, he said, was also the wish of some Swiss watchmakers, and if it were done, both English and foreign watches would stand on their merits.

The resolution was then put and carried unanimously.

Mr. LEE moved "That neither the public, the trade nor the Legislature having ever signified any wish that the English Hall-mark should be placed on foreign watches, and having proved to the satisfaction of a select committee that it is only used for the purposes of fraud, this meeting considers they are only pressing for their just rights in asking the Government to pass a short measure."

Mr. ISAAC, in seconding the resolution, remarked that in trade there should be no politics, and he was pleased to see members of both parties on that platform advocating a matter so vital to the interests of the trade. He urged them to organise themselves into a committee, that they might as soon as possible get their grievance redressed by Parliament. He promised that, although no longer a member of the House of Commons, he would bring to bear all the influence he could upon the members of that House, so that with their own members they would have a strong interest in that body. (Cheers.) The resolution was then put to the meeting and carried unanimously.

Mr. NEWMAN moved "That our representatives be earnestly entreated to take active and immediate steps to press upon the Government the importance of bringing in an Act to preserve the English Hall-mark for English cases and movements only, and that the representatives of Islington, Liverpool, Coventry and Lancashire be asked to take part in carrying out this measure," which was seconded by the Rev. C. J. OLIPHANT and carried.

It was finally decided that it was advisable to form a trade protection society, and the meeting closed with a vote of thanks to the chairman, and the vicar of the church for the use of the schoolroom.

British Association for the Advancement of Science.

THE "INDUSTRIES" EXHIBITION AT BIRMINGHAM.

WATCHMAKERS, jewellers, silversmiths, electro-platers, and those whose time and talents are devoted to the pearl and ivory trades, have, during the past month, been reaping a rich harvest of valuable information, the fruits of which will doubtless bring increased honour to the great Metropolis of the Midlands, in which the varied and numerous specimens are produced.

It would be impossible to do justice to any one of the exhibits, and in furnishing a descriptive report for the trade throughout the country, one is conscious that many important items have been omitted—in some cases in compliance with the request of the exhibitors, and in others through their delay in supplying the necessary information; certainly none have been neglected with wilful intent—but because the great scope of the exhibits, presenting as they do a most dazzling display, demands long study and descriptive power of a quality that rarely falls to the lot of one man, we strongly advise our friends to make themselves personally familiar with the particular sections we have endeavoured to describe, and are confident that they will be richly repaid.

First on our journey is

THE TROPHY.—Case of the Association of Manufacturing Jewellers.—This is a wonderful collection of the finest specimens of the jeweller's art, and is of great value and extent. Some of the principal manufacturers have generously contributed to make it the success which it certainly is; to attempt a description of its varied contents is an almost impossible task, and in endeavouring to give an idea sufficiently intelligible, we will give each contributor's goods in the order in which they are arranged.

Mr. JOSEPH WAINWRIGHT, of 184, Warstone Lane, has the left-hand base of the Trophy, and his collection forms a grand assortment of brooches, pendants, bracelets, lockets and pin-studs. The brooches all vary in character, from the simple and unique initial brooch set in pearls, which, by a novel arrangement, forms the name of the exhibitor; the centre also forms a letter W, composed of brooches of a special character. One of the chief features of this gentleman's exhibit are the very fine brooches of rich Etruscan work, others richly set with pearls and diamonds. The fan with enamel forget-me-nots, together with the tie "forget-me-not," are very unique designs. There is also a collection of expensive diamond pendants and brooches, which form a centre of this exhibit. The bracelets also are of a unique character, showing simply a few of the many designs of Mr. Wainwright's manufacture. A few pins only are displayed. Mr. Wainwright is a manufacturer of every description of fine gold jewellery.

Adjoining the latter section is a very fine production of diamond goods manufactured by Mr. G. W. WHITEHOUSE, Hylton Street. The centre of the base is a very fine necklet set with diamonds of splendid colour and exquisite design, surrounded by several artistic designs of Fishue brooches set with diamonds and other gems. At the foot of this base are a few examples of bracelets of very rare and pretty styles. Mr. Whitehouse also exhibits a fine collection of ladies' gem rings, gentlemen's scarf-pins, and ladies' earrings, all of excellent workmanship and fashion.

Surmounting this base is a double exhibit of Mr. G. H. JOHNSTONE, of Northampton Street, who shows a large and varied collection of gentlemen's jewellery, such as sleeve links, solitaires, studs and pins in almost every form conceivable, in 15 and 18 carat gold. The sets of studs are whole pearls of rare value; others are of a simple character, forming a half bead. In the collection of links, we notice the cannon which has for the opposite link a ball. We also observe studs and links of a sporting character, such as the horseshoe and whip. His collection of pins are selected with a view to suit the sporting as well as the most fastidious taste.

Passing on to the right-hand portion of the Trophy is a very excellent exhibit of set pearl goods by Mr. W. H. Small, of Pitsford Street. Many of the designs are worthy of notice. The centre attraction is a very fine pearl necklet of beautiful design and workmanship, set with pearls of very white and even colour, surrounded by brooches and pendants of a similar character. We also see a brooch in the shape of a butterfly set in pearls and corals, others with the harp and spray. There is a capital collection of pendants of first rate design and quality, richly set with pearls and corals; also a crescent brooch set in pearls. Mr. Small shows a choice collection of bracelets, mostly pearl and coral set. There is one beautiful design we must not omit, viz., the "Harp and Shamrock," set in pearls on a gold band. Others also are richly set with diamonds, intermingled with diamonds and pearls of exquisite taste. A portion of this gentleman's space is set apart for mourning brooches, pendants and earrings, of plain and good designs, set with pearls and enamelled. These goods are a specialty of Mr. Small's, and for which his reputation in the trade is unequalled.

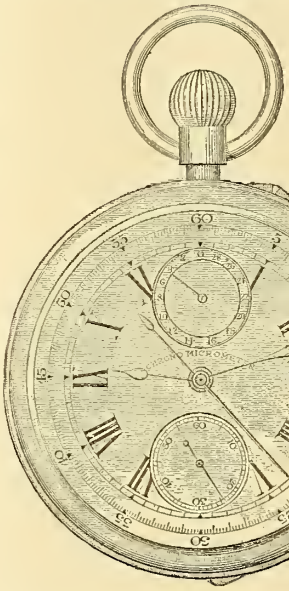
Adjoining the last-mentioned exhibit is a very fine collection of bracelets and brooches manufactured by Messrs. Jones & Lees, of Spencer Street, the chief features of which is a varied collection of bracelets of exquisite style. Some are set with diamonds on gold of a plain character, others are set with diamonds and pearls, whilst some, worthy of notice and of special description, with raised ornaments of different coloured gold. The centre of this exhibit is composed of seven fine specimens of lockets, all varying in design, yet maintaining the excellence of workmanship for which this firm is famous. We also notice several unique brooches, as amethyst with pearl border of fine workmanship, together with some prettily designed Fishue brooches and hairpins. There are also several designs in scarf rings, which retain the same character of workmanship as the other goods.

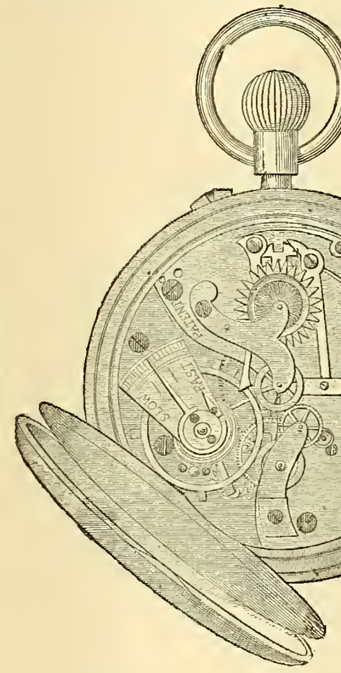
Surmounting this case is Messrs. Charles Green & Son's (Augusta Street) magnificent exhibit of ladies' and gentlemen's rings, some of the most prominent of which are ladies' rings of exquisite design, set with diamonds and sapphires, others with emeralds and sapphires; and some fine gipsy rings set with pink coral, others in turquoise: all being really beautiful in finish and pattern. This exhibit is so grand that it is impossible to do it justice, and we can only ask our readers to give it a personal inspection, whilst the collection of gentlemen's rings is of such varied character and such excellent finish, that the most fastidious critic could not help being satisfied. This collection forms the most valuable of the whole Trophy, being chiefly composed of rich and rare gems of the finest quality.

On the counter of this Trophy is a double case, which contains an exhibit of Messrs. H. Filter & Sons, of Hylton Street, manufacturers of gold chains of varied styles in 15 and 18 carat gold, together with an exhibit of seals manufactured by Messrs. Barber Brothers, Northampton Street. These two classes of jewellery are generally worn together, and are, therefore, grouped in one case. All are of excellent design and creditable in every sense to the makers.

Messrs. Allen & Martin, of Great Hampton Street, have adjoining this case a first-class collection of watches in 18 carat gold cases manufactured by themselves. They are of English make and of high-class quality, mostly of the keyless action. One of the principal attractions in this case are three watches made for the blind.

English Watch Company, Limited, Birmingham.—*Watchmaking by Machinery.*—When at the Inventions Exhibition, the American Watch Co. startled English watchmakers by an exhibition of the various processes used in the manufacture of their watches, on a scale of such magnitude, that English manufacturers, who were unable to obtain more than a few feet of space, were alarmed at the too probable effect their rival's success would have upon the public. English watchmakers are now awake with regard to the reality of the American competition, and the contempt or indifference with which it has been regarded in the past is also at an end. It has been left to the English Watch Co., Limited, to prove that they at any rate are able to compete with their American cousins, and are determined to increase their already great reputation for high-class and reliable English levers. Their stand, extending some thirty feet double frontage, and occupying one of the most prominent positions, is filled with machines whose accuracy is infallible, and which, when in motion, are surrounded by great crowds of visitors. Exclamations of admiration and wonder are continually heard when the workpeople hand round for examination finished portions of watch movements, the attendants freely answering the many inquiries, and endeavouring to explain to all classes the uses for which the various parts are intended and the means by which their perfect state is attained. The following are the names of the machines in use in the stand:—universal lathe and attachments for machinists and watchmakers; universal automatic wheel-cutting machine; cutting micrometer wheels and bevel wheels and pinions for keyless work, &c.; drilling tool for fine steel work; lathe for turning and drilling fine steel work; automatic pinion-cutting machine; squaring end of barrel or winding arbors, cannon pinions, &c.; barrel, arbor or cannon pinion polishing tool (wig-wag); lathe for turning pillars to frame plates and similar work; upright tapping tool for frame plates; upright drilling tool for frame plates; barrel-making lathe (two); universal wheel-tooth cutting machine; balance staff pivoting lathe with automatic polisher; screw-head slotting machine; universal screw-making lathe, fitted with mitrailleuse head, cross slide and back feed. These are of course but a very small proportion of the Company's plant; over three hundred are at work in their shops, and there is room for many more.



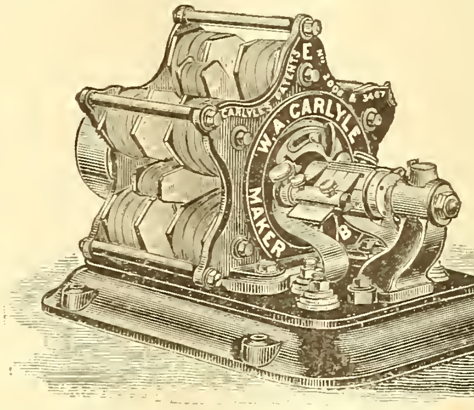


The English Watch Co., Limited, has supplied the India State railways, foreign railways and the leading lines in Great Britain, as well as special watches for the War Department, and are well known in the Colonial markets. At the end of the range of machines are several large cases of finished watches in gold, silver and nickel, and also cases displaying for inspection finished specimens of every portion used to make the complete article. Amongst the finished watches ready for the pocket is the patent "*Chrono-Micrometer*," a keyless watch of high quality, with which is combined a novel and perfect mechanism by which a new power is given to the wearer—the power of measuring off, with absolute accuracy, any portion of time, from a fraction of a second up to any number of minutes, the record of the observation being shown, down to a fifth of a second, on the dial, by independent pointers. The special advantages claimed for this watch over other chronographs are its extreme simplicity, the consequent non-liability to derangement, and certainty of its action, whilst the going part, which travels steadily on, undisturbed by any use, however frequent, that is made of the micrometer arrangement, has all the well known substantial quality and durability of the English $\frac{3}{4}$-plate lever watch. The Company also exhibit a patent *Independent* centre seconds watch; this has a centre seconds hand that can be stopped or started at will, *without stopping the watch*. This watch solves the problem of an independent seconds at a popular price, and its introduction marks an era in the trade. Railway guards' keyless watches are a specialty of the English Watch Co., a number of which are shown; these watches are of great strength and durability, the movement being of fine quality, with ruby jewellings and chronometer balance. The Company have generously consented to continue their exhibit for another month, and we hope the reward they most certainly merit at the hands of buyers will be accorded them, their production being, without exception, equal to any in the market.

Elkington & Co., Newhall Street.—Three stands are occupied by this celebrated firm, and, for beauty and interest, it would be impossible to surpass them; they are filled with the most valuable specimens of the firm's manufactures. The case is made of ebony and lined with gold, with noble wings, and richly draped with cloth and marone plush; examples of skilled work are arranged with great taste, and form a very pleasing and beautiful sight. The stand itself is surmounted by a trophy of flags, while the pilasters are ornamented with bronze busts—one of Dante and the other of Milton. In the central case are displayed a variety of shields: the Pompeian Lady plaque: a jardinière representing agriculture: a jardinière in *repoussé*, by Morel Ladeuil, the celebrated artist; also in electrotype a copy of St. Patrick's shrine, ornamented with crystals of various colours representing rubies, turquoise, &c., a very beautiful piece of work; the famous Milton and "Pilgrim's Progress" shields, also by Morel Ladeuil, occupy a prominent position; there is also an electrotype centaur tankard and another tankard descriptive of a tiger hunt. We observe too an electrotype gilt race dish and a Queen Anne tea and coffee service in electro-plate, with wood-bottom mounted tray inlaid with rosewood, a very fine specimen of workmanship. For everyday use there are waiters, cruets, candlesticks, breakfast dishes, &c. Many are delighted with a handsome dessert service, highly chased and richly gilt in relief, designed by Mr. Wilms, after antique models from Herculaneum, whilst the rose-water dishes are beyond praise. To athletes, two new shields, intended to take the place of cups, will draw instant attention; they are of splendid finish, clear and distinct in every particular, and will, undoubtedly, be treasured as samples of high art by their future winners. The back of the right wing is decorated with a trophy of antique arms and armour, and on the platform in front are specimens of electro cast and real bronzes, the most important being statuettes of the Prince Consort, Burke and Goldsmith, a faithful copy of Cleopatra's Needle, and the Slave, a statue lent to the Art Gallery for some months; the former of these are reproductions from Foley's models. With the other bronzes is noticed a group of stags, modelled by Landseer; the only model, it is believed, he ever completed—a group representing Hercules subduing the Œnonian stag, and a group illustrative of "the kill" in a fox hunt. The left wing has arranged on its platform splendid specimens of the new art gold bronze work, a special mixture belonging to Messrs. Elkington, and having the same colour all through; it is of a light gold colour, rich in appearance, and made up in various designs by a recently discovered process of casting. In this metal there is a copy of the "Museum Vase," the "Helmet Jug" (the original of which was purchased by the Prince of Wales at the Paris Exhibition), also other beautiful specimens. Messrs. Elkington prove themselves to be far in advance of all competitors, and, in our opinion, are unrivalled, both as regards artistic effect and quality of their productions.

Mr. John Thomason, 1 and 3, Spencer Street, exhibits samples of sterling silver goods, which, although not occupying a great space, yet serve to show the variety of his wares. All classes of persons may find suggestions for presents and future guidance in regard to birthday and wedding gifts; as well as an assortment of articles suitable for those occasions, there are christening mugs for youthful tipplers and babies' rattles for the edification of their parents, challenge cups for the forthcoming season, card cases, dram flasks, match boxes, scent bottles, &c. These goods are finished in a variety of ways, including panel gilding, oxydising, frosted silver and bright burnished silver, giving buyers a rare opportunity of comparing their merits, and increasing, by a glance, their knowledge of the various styles in which silver goods are finished. We are pleased to draw special attention to an exceedingly pretty and chastely executed *tête-à-tête* tea service in silver gilt, the design being extremely neat and effective; also to a case of salt cellars, muffineers and mustard pots, similarly finished. Presentation trowels are a specialty of Mr. Thomason's, who, in addition to the above, shows a very stylish pair of fish carvers.

Mr. W. A. Carlyle, Dynamo Works.—*Manufacturer of Electro-plating and Polishing Machinery and Materials.*—At this stand there is exhibited a complete plant for depositing nickel, silver, brass and copper, in operation. Also the various processes of metal polishing. The trade is indebted to Mr. Carlyle for the intelligent manner in which this plant is displayed; the processes can be seen and readily understood by any one possessing the least knowledge of the business, and cannot fail to be of much value to interested visitors. There are several of his patent dynamo-electric machines, similar to those used by the principal firms, also samples of the various chemicals, including cyanide of potassium, nickel salts and appliances, such as resistance boards, tanks, scouring benches, batteries, connections, and nickel anodes, all of which are used in the process of electro-deposition, and for which he has attained a good reputation. There is also a complete set of scratch brushes, lathes and polishing compositions, all of which are manufactured at Dynamo Works. We are indebted to Mr. Carlyle for much valuable information; and for the public it is interesting to see the articles by means of which many of the beautiful effects, shown in the surrounding cases, are obtained. The Exhibition would be incomplete without Mr. Carlyle's stand.



Messrs. N. C. Reading & Co., 186 and 187, Warstone Lane. Stand 148.—Amongst the variety of articles herein displayed we see many that call for notice, and if a full description were attempted notice of others would be largely curtailed. We are pleased, however, to draw attention to the following, as being specially deserving of our attention: Hall-marked silver alberts, in fancy patterns, and specially manufactured for the London West End market; all are of superior make and finish. Sterling silver ladies' alberts. Albertines and necklets in excellent designs, made for home and foreign trade, including some gold-mounted and panel-gilt patterns intended for the Colonies and Continental market. The registered "Warstone Best" 18 carat gold cased alberts, which stand the test of acids. It is

BAUME & Co.

21, HATTON GARDEN, LONDON;
— AND AT —
GENEVA and LES BOIS, SWITZERLAND.

ESTABLISHED 1834.

Every description of ordinary Watches, in different qualities.

Fine and complicated Watches.

Specialties in Levers, ¾-plate Keyless.

Longines Levers, made on the gauged and interchangeable principle.

Materials supplied entirely finished.

CAUTION.

Trade Marks Registration Act, 1875.

Messrs. BAUME & Co. hereby give notice that they will Prosecute to the utmost extent of the Law any persons found dealing in Watches bearing either of their Registered Trade Marks and not being of their manufacture.

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BAUME GENEVE.

BAUME LONGINES.

CHARLES HECTOR GOLAY,

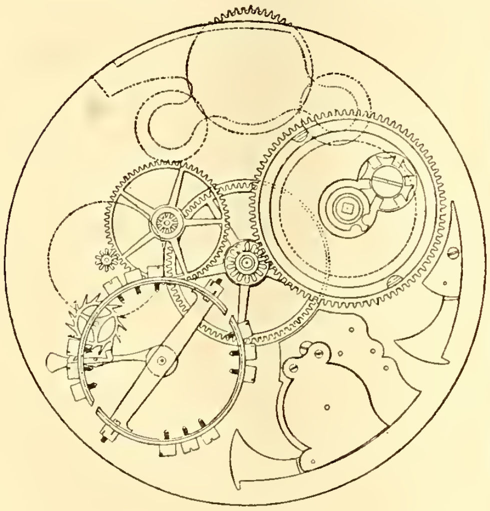
Manufacturer of Repeaters, Chronographs and Calendar Watches of every description,

Inventor and Patentee of the New Calibre of Movement for Complicated Watches,

46, MYDDELTON SQUARE, LONDON, E.C.

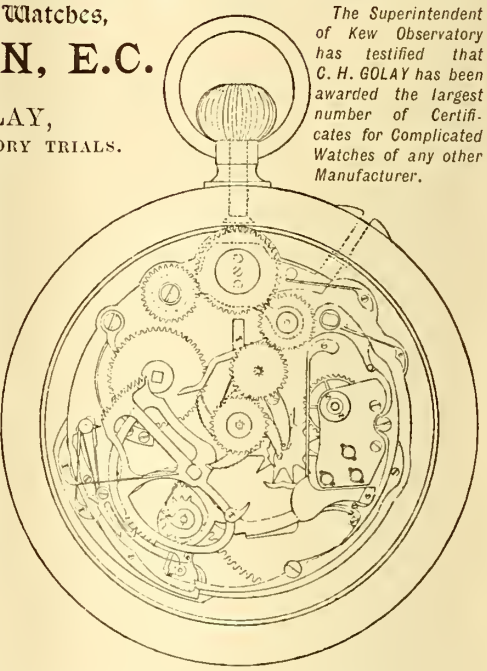
The Superintendent of Kew Observatory has testified that C. H. GOLAY has been awarded the largest number of Certificates for Complicated Watches of any other Manufacturer.

Specimens of the Class of Watches manufactured by C. H. GOLAY, which have been awarded Class A Certificates at the Kew Observatory trials.



THESE WATCHES HAVE ALL BEEN SPRUNG BY J. F. COLE.

CLASS A.	No. of Marks
Keyless minute repeater	*64*
Keyless minute repeater clock-watch	*74.9*
Keyless minute repeater	*73*
Keyless half-quarter repeater	*64.8*
Keyless minute repeater, minute chronograph	*71.6*
Keyless minute repeater	*75.7*
Keyless minute repeater	*76 2*
Keyless minute repeater	*78.3*
Keyless fly-hack minute chronograph	*68*
Keyless fly-back chronograph minute repeater	*60.6*
Double fly-back keyless chronograph	*50.0*
**Keyless minute repeater, minute chronograph, perpetual calendar watch*	*69.5*
Keyless minute repeater	*73.1*
Keyless minute repeater	*65.8*
Keyless minute repeater clock-watch	*75.3*
Keyless ¾-plate	*64.9*
Keyless minute repeater, perpetual calendar, clock-watch	*65.7*
Keyless ¾-plate	*68.4*
Keyless minute repeater, perpetual calendar	*76.3*
**Keyless minute repeater, perpetual calendar, minute and second chronograph*	*71.3*
Keyless ¾-plate	*63.3*



ESPECIALLY GOOD A.

Keyless minute repeater clock-watch ... 78.7 Marks. This is the only Clock-Watch which has ever gained an "Especially Good" Class A Certificate.

* *These are the only Watches of their kind which have ever gained Class A Certificates.*

As the majority of these Watches are constructed on Golay's new principle, the great success attending them at the Trials is a further proof of the superior timekeeping facilities afforded by this calibre.

SETH THOMAS

CLOCK COMPANY,

7, CRIPPLEGATE BUILDINGS, WOOD STREET, LONDON, E.C.

ROBERT M. MARPLES, Manager.

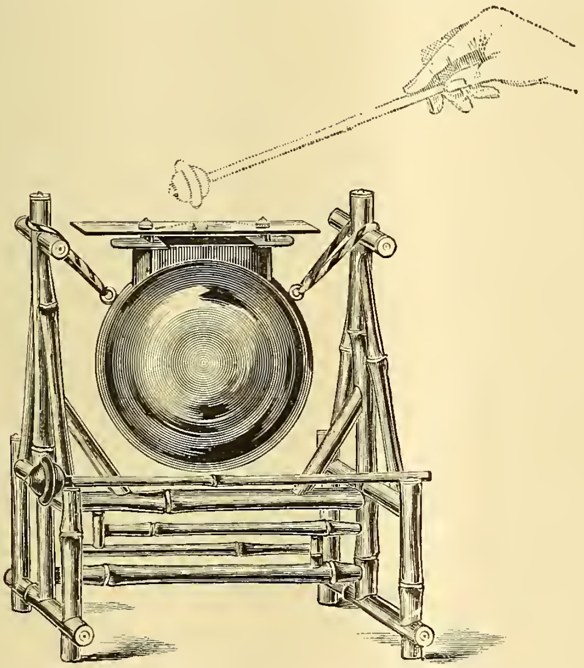
Manufacturers of Watches and of all kinds of Clocks of Best Quality only.

SOLE WHOLESALE AGENTS FOR THE ELGIN NATIONAL WATCH COMPANY.

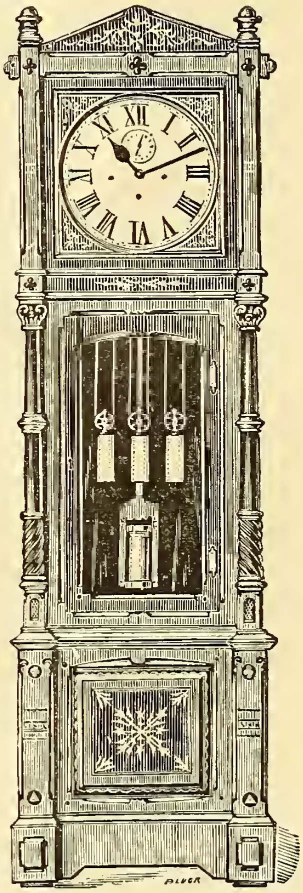
Send for New and Reduced Price List of Nickel Lever Clocks.

worthy of note that these goods are made by workmen previously employed in the fine gold trade, and are finished with an excellence that would deceive an expert; the alloy used is a specialty of the firm, and is all through of the same colour as the casing. We consider this an improvement on the best qualities of American goods, which are mostly plated on German silver, and consequently turn white in wear. We notice the popular curb and wire patterns are retained in this exhibit, and the round loose links, so awkward to clean, are avoided. The "Tandem Albert," a neat and useful article, in "albo silver." There are samples of chains, necklets and pendants. "Albo silver" is well known to the trade as a pure white metal, and we are pleased to learn that Messrs. Reading & Co. experience a large demand for it.

T. **Wilkinson & Sons**, Pelican Works.—This firm has a large exhibit of their manufactures. Immediately in front of their show case is arranged a set of "patent resonating gongs." These gongs produce a perfect musical note of great breadth and purity of tone. Their construction consists essentially of a properly shaped resonating chamber, with a vibrating metallic plate of sonorous metal or alloy resting across it. The note is produced by striking the plate *downwards*, a decided advantage when placed upon the tea or dining table. The gongs vary in size from a two-inch tea gong to a dinner gong of three or four feet diameter, and are mounted on electro-plated, bamboo or oak stands, according to size. Each gong has the note of the musical scale with which it corresponds engraved upon it. Messrs. Wilkinson intend introducing to the public full-sized piano or "gong chords," in which the new gongs will be utilised in lieu of strings. From the above, our readers will at once perceive that the gongs are both pretty as well as useful articles.



Messrs. **Levetus Brothers**, Vittoria Street.—*Canadian Gold Chain and General Jewellery.*—This exhibit displays a quality of style and workmanship that formerly was considered unnecessary in the manufacture of imitation gold goods; the various articles are finished with such care and skill, that they equal in appearance any of the more valuable products. Messrs. Levetus Brothers have for many years endeavoured to supply a really good substitute for pure gold and have undoubtedly succeeded at last, the whole of their manufactures being *Mercurially Fire Gilt* on their *Patent Metal*, the distinguishing characteristics of which are, that it has a special affinity for mercury, enabling it to take the mercurial fire gilding easily and without loss, also that it is of a *rich gold colour throughout.* We have never seen anything to equal them in richness of appearance, lustre or finish; in wear they are to be thoroughly relied upon. Messrs. Levetus Brothers deal only with wholesale houses, and have at their works an extensive plant of machinery. The whole of the exhibit has been sold to Mr. T. E. Mannox, of Worcester Street.

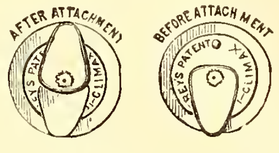


Messrs. **Swinden & Sons**, who occupy a shop in the Old Birmingham Street, in the midst of nailers, gold beaters, chair makers and other ancient crafts, are found attracting no mean proportion of the throng which is continually crowding up and down the narrow pathway. Unfortunately a fair view of the front case cannot be obtained, because of the crush, and we gladly escaped through a side door into the ancient-looking establishment, receiving a cordial reception from its guardians. It is a square room, two sides of which are adorned with venerable timepieces manufactured in the sixteenth and seventeenth centuries, and when facing these old relics one is apt to look round for the white cap and wrinkles, so stern and respectable is their appearance; however, on a closer survey we discover much to attract and please. One magnificent old fellow, whose face speaks plain truth, tells us he has passed a century away amongst us; he looks as jaunty and fit after it as a bran new, modern 10s. 6d. tick, tick, only they are subject to fits and commence life with fast living and leave it without regret. The old "grandfather" we are admiring is in a case of great beauty, inlaid with five kinds of wood, in the execution of which great taste and skill is displayed; it is said to be the work of a Venetian, and is valued at about 100 guineas—Benjamin Heely, of Deptford, is on the dial. On either side of this masterpiece are splendid specimens of "grandfather" clocks, all of English make, curiously carved and ornamented. Another side of the room recalls us back at once to the present; school and office clocks are hung up for inspection, whilst, underneath, our eyes rest upon some very pretty chime clocks, amongst which an English chime clock, chiming quarters on eight bells or Westminster on four bells, and hours on a gong. This is a splendid piece of workmanship, and when it is chiming one could imagine himself on Westminster bridge, so closely do their sounds resemble Denison's masterpiece—a turret timepiece fitted with gravity escapement, steel lantern pinions, gun-metal wheels, and compound pendulum, the ball of which weighs 1 cwt. This clock is built for the tower of the Princess Alice Orphanage, New Oscott, and reflects great credit upon the makers. Passing from the various kinds of clocks, of which there is a large assortment, we endeavour to forget the noise of the nail makers and other adjacent industries, all actively engaged upon their various tasks, and examine the case of old and modern watches. In the latter section we notice an improvement in the form of a revolving bow on the pendant, and expect wearers will find this a great convenience. There are also watches of the highest quality, some with beautifully engraved and enamelled cases and others perfectly plain. In this case there is an old seventeenth century pair case watch, finely embossed, and one made by Moore, of London, nearly two hundred years ago. There is also a row of aneroid barometers and pedometers; also an artistically finished case, upon the back cover of which there is an enamelled horse and jockey. A monogram of eight letters on dead gold calls for great praise, it being executed in a very clear manner. Closing a pleasant interview, we proceed to

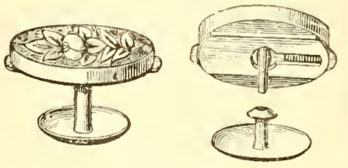
Messrs. **W. F. Evans & Sons'** stand in the centre of the Exhibition. There are not a great number of objects for inspection here, yet each of them are notably examples of the art of clockmaking. Messrs. Evans & Sons are known all over the civilised world as makers of reliable and trustworthy clocks. In the United Kingdom, especially, they have a great reputation: almost every town or village of importance possesses one or more of the clocks made at this factory; and they are so well known and respected that it is sufficient to select for mention one or two items of their exhibit only. First, a large turret clock for Cambridge chimes, with gravity escapement; and, secondly, a chime clock, fitted with bells and gongs, also with Harrington's patent tubes. There is an object of peculiar interest to the trade exhibited by Messrs. Evans & Sons, viz., the first gravity escapement ever made. To Mr. William Murdock did the honour of inventing this escapement fall, it being made by him when at Messrs. Boulton & Watts' Works, Handsworth. We may mention that Mr. Evans was a relative of Mr. Murdock.

F. Derry, Phœnix Electro-plate Works, Upper Hockley Street. In his exhibit Mr. Derry has wisely confined himself to the task of submitting the finest and choicest specimens of his manufactures. Each article is in itself a work of art, and to the careful student will afford abundance of information. The exhibit consists of match and snuff boxes, card and spectacle cases, purses and tobacco boxes. These are made of sterling silver and electro-silver plated, finished in various styles, amongst which we noticed some beautifully engraved and enamelled specimens. Attention should be directed to those displaying a richness of gilt inside seldom equalled; in addition to this quality they are highly ornamented with a variety of colours and patterns in gold and silver. This, indeed, is a peculiarity of the exhibit, and has been fitly called enamel-gilding and plating. The artist has deftly seized and blended the most delicate colours with a marvellous effect. There are also spoons and forks—examples of a new alloy—which possess peculiar and distinctive properties, the specimens of which surpass anything we have seen produced in any other substitute for real plate. Mr. Derry claims for this alloy a richness of colour, hardness and durability equal to sterling silver, also that they are not liable to become discoloured. A cigarette case in silver is beautifully *enamelled:* "A View on the Teith, below Callender," after Clarkson Stansfield, R.A. On some of the boxes are enamelled flowers, &c., and some flags for yachting purposes. Mr. Derry deserves the thanks of the trade for his admirable display of fancy and useful articles. There are many things we are obliged to omit in our report of his "Phœnix" electro-plated goods, but trust that increased public favour will make up for our omission. He occupies a prominent position in the trade, and is one of the *senior manufacturers* of electro-plate and nickel goods always ready to adopt practical suggestions, and in the varied productions of his trade remains unsurpassed.

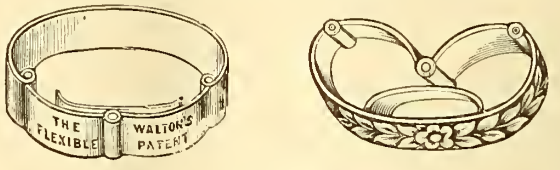
G. E. Walton & Co., Hylton Street, exhibit samples of the patents for which they are famous. Perhaps there is no other house in Birmingham that has brought out so many useful and clever inventions to the notice of the public. They hold a surprising list of patents, and we believe the whole of them has met with a considerable amount of public favour. In the manufacture of keys of various styles, and of which there are exhibited many illustrations, they are unrivalled. Their patent watch protector, or thief catcher, is a very ingenious invention by Chief Inspector Williams, who certainly should know what is best in this line. In solitaires there is "West's Patent," the "Bi-Climax," and the "Safety," all manufactured in gold or with gold plate. Walton's Patent Flexible Self-acting Scarf-slide is a capital article and easy to adjust—a quality scarf rings seldom possess. There are also shown specimens of Birche's patent "Universal" watch keys, ordinary gilt and nickel watch keys, "Crocidolyte," or Cape cat's-eye, jewellery in great variety, pearl jewellery and models, gold and silver seals and compasses, coloured and bright gold and silver ladies' tassel albert chains, besides a quantity of novelties. The firm is famous for its productions, and is continually adding to its large list of manufactures. The goods are made up with a finish seldom found except in work of the highest and most valuable description.



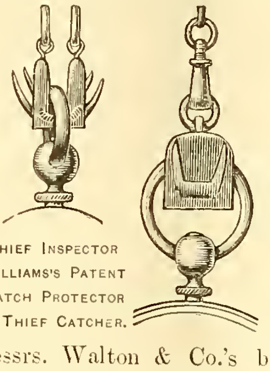
Patent "Bi-Climax" One-part Solitaire.



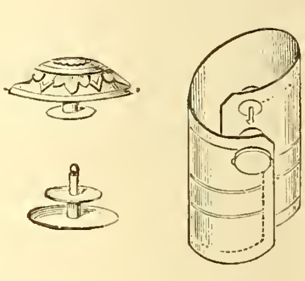
West's Patent Solitaire.



Walton's Patent Self-acting Flexible Scarf Ring.



Chief Inspector Williams's Patent Watch Protector or Thief Catcher.



Patent Safety Solitaire.

Messrs. Walton & Co.'s business was established some forty years ago, and employs, we believe, upwards of three hundred pairs of hands.

Mr. **B. W. Westwood**, 20, Warstone Lane. This is not a large exhibit so far as space is concerned, but in range and variety it would be impossible to find another to equal it in the Exhibition. Mr. Westwood has the finest collection of cameos in the trade, and is the recognised chief of this department of jewellery. His name is known wherever cameos are found or carved, and no really good stone is overlooked by him. With an experience of many years, and an artistic taste of a quality rarely met with, he is admitted to be the greatest authority upon all matters touching either the quality, colour or purity of this peculiar stone. Amongst the many beautiful specimens—all of which are carved with a wonderful regard for detail—there is an amethyst cameo pendant, with carved portrait of "Mary, Queen of Scots," mounted on gold, with diamonds and pearls; two Labrador cameos, with carved heads of Hector and Mars, encircled with diamonds and corals; and a Flora in onyx cameo, richly mounted, and having a set ruby for an earring and a diamond, in similar fashion, as a brooch—a beautiful piece of workmanship. There are specimens of black onyx of a very chaste design of Mr. Westwood's: one bears the head of Dante, copied from a celebrated painting of that celebrity. We notice some very fine diamond, pearl, coral, opal, ruby and emerald pins; lapis lazuli pins are also shown. The manner in which the exhibitor has made use of his space is highly creditable; nearly every kind of jewellery finds a place, and is illustrated by a few specimens of the finest description. Opposite this case is a choice collection, including some platinum and gold pins of a unique description, such as the snaffle bridle, horseshoe and hunting horn, animals on horseshoes, spurs, &c. Mr. Westwood manufactures fine gold pins and cameo pins. Amongst the latter we see a very finely executed one with head of Hercules, having a lion's skin drawn partly over, and surrounded with pearls, opals and diamonds; an onyx shell with pearl in centre; whilst an onyx Satyr pin calls for special praise. There are many others quite unique—indeed, it would be impossible to match them. In this section Ford's best efforts are displayed and mounted in rare taste. Many of the paintings are splendid copies of Landseer's celebrated heads; there is also an Essex enamel of rare beauty. Mr. Ford is undoubtedly the greatest pupil of this great master. Solid-cast gold animals, such as the

EXHIBITION. No. 150. } British Association for the Advancement of Science, BIRMINGHAM MEETING, 1886.

F. DERRY,

Phœnix Works, 31 & 32, Upper Hockley Street,
BIRMINGHAM,

Manufacturer of
MATCH BOXES, SNUFF BOXES, SANDWICH CASES, CIGAR & CIGARETTE CASES, SPECTACLE & CARD CASES, in Electro-Plate and Sterling Silver.

THE "PHŒNIX ELECTRO-PLATE,"
REGISTERED TRADE MARK.

"SPANISH SILVER"
TRADE MARK

SPOONS and FORKS

Surpass all other substitutes for REAL SILVER in colour, hardness and durability. They improve by wear, and are the same colour throughout.

Buyers are cautioned against worthless imitations, having only a false surface colouring.

CHARLES WESTWOOD & SONS,

GOLD AND SILVER REFINERS,

14, HALL ST., BIRMINGHAM,

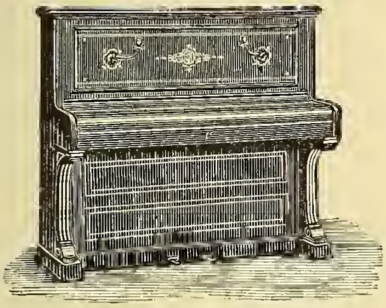
Dealers in JEWELLERS' REQUISITES, and in Fine and Alloyed Gold and Silver, Sheets, Wires, Stampings, Beads, Solders, &c.; also Alloys, Refined Copper, &c.; Coloured and Bright Gold Beads, and also in Silver.

BANGLE, COIL & BELCHER BRACELETS DRAWN OR SPUN.

Bars, &c., containing Gold and Silver, assayed the same day.

Photographers' Waste and Jewellers' and Dentists' Sweep purchased at full value.

VENABLES'



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COMBINE
STRENGTH AND DURABILITY
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ESSEX ROAD, ISLINGTON.

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French Clock Manufacturers.

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THE LARGEST STOCK OF

CARRIAGE and FRENCH CLOCKS (own make).

CARRIAGE CLOCKS (own make) PATENTED.
Vide HOROLOGICAL JOURNAL, July, 1881.

Rewarded at the following Exhibitions:—
PARIS, 1878. SYDNEY, 1879. MELBOURNE, 1880.

AMERICAN
WALTHAM WATCH
COMPANY.

◆◆◆

We beg to call the attention of the Trade to our New Price List, dated July 1st, 1886, which will be sent post free on application accompanied with business card.

We believe the market offers nothing of any other make to at all compare with the goods we offer in such a combination of quality and price.

These goods, bearing the name of the Company, are sold upon their merits, which, we believe, will be more evident and acceptable to dealers and to the public than the fictitious value often claimed for goods of less established repute than Waltham.

ROBBINS & APPLETON,
GENERAL AGENTS.

Waltham Buildings,
Holborn Circus, London, E.C.
July 1st, 1886.

MESSRS. STAUFFER, SON & CO.,

WATCH MANUFACTURERS,

OF 12, OLD JEWRY CHAMBERS, LONDON,

And CHAUX-DE-FONDS, SWITZERLAND,

Beg to inform their Customers and the Trade that, owing to the very great success of their Third Quality Watch, they have registered the following Mark to denote such quality - - - - - - - - - - - - - △ △ △ S S & C°

which they will henceforth use in addition to their well-known Trade Marks:

STAUFFER
C*x *DE FONDS

S & C°

MESSRS. STAUFFER, SON & CO. take this opportunity to state that they have discontinued the use of a mark which comprised three stars, as they discovered that such mark somewhat resembled the mark of another house.

The **ATLAS LEVERS** always bear the Registered Trade Mark,

"THE ✦ ATLAS ✦ WATCH,"

on either top or bottom plates, according to Customer's desire.

Show Cases made to any Design in 24 Hours.

THE JEWELLERS' SUPPLY COMPANY, LIMITED,

32, CLERKENWELL ROAD, LONDON, E.C.

Works:—*16 & 18, St. John Street Road.* CHARLES LAWRENCE, *Managing Director.*

Shop Fittings, Glass Cases, Tickets, Hooks, Card Boxes (nested), Tissue Papers.

JEWELLERS' WOOL, JEWEL & PLATE CASES & STANDS.

Adhesive Price Tickets, Wooden Post Boxes, Simplex Watch Tabs, Job Envelopes, Parchment Tabs, Cardboard Tie-on Tabs, Card Ring and Thimble Cases, Brass Jewellery Labels, Porcelain Show Tablets.

WATCH MATERIALS. JEWELLERY MATERIALS. OPTICAL GOODS. GOLD PLATED AND WHITE METAL JEWELLERY.

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CHRONOMETER AND WATCH MANUFACTURER,

EVERY DESCRIPTION OF HIGH-CLASS KEYLESS AND ORDINARY WATCHES,

105, LIVERPOOL ROAD, LONDON, N.

AWARDED SEVEN GOLD MEDALS AND FOUR DIPLOMAS OF HONOUR (HIGHEST AWARDS), and ***The FIRST PRIZE, with the FREEDOM OF THE CLOCKMAKERS' COMPANY of the CITY OF LONDON, TRIAL, 1881, and the SECOND PRIZE for the FINEST CHRONOMETER ever tested at the ROYAL OBSERVATORY, 1882.***

Chronometers with Mr. KULLBERG'S new Balances and other improvements have stood the First or Second FOURTEEN times in the Royal Observatory at Greenwich, out of over 540 competing Chronometers.

At the Sydney Exhibition, 1880, two First-Class Awards were obtained; and although the Watches were not expected to be entered for competitive trial, they obtained, at the Government Observatory at Sydney, higher marks than those of any other Exhibitor.

running hare, foxes, dogs, hobbled stags, and bulls' heads, are mounted as pins. Mr. Westwood is a manufacturer of gem rings of best qualities, also bracelets, brooches and steel and gold rings. We must, before leaving this exhibit, call attention to two shell cameo brooches; the subject of one is, we believe, taken from the Odyssey, and the other represents Cupid engaged in congenial employment. It is claimed for these that they are the finest produced by the Italian masters.

Messrs. **Forrester Brothers**, 1, Summer Hill Terrace. In several neatly-arranged cases on one of the side galleries Messrs. Forrester display an assortment of their goods in pearl, ivory, bone, &c.; there are large cards containing collar and shirt studs, links and solitaires, in each of the above-mentioned articles, whilst specialties, such as ladies' buckles, bonnet ornaments, clasps, brooches, earrings, &c., are in great variety. It is a very interesting exhibit, and until one sees it, it is impossible to realise the number of articles manufactured by them. We were unfortunate in not obtaining Messrs. Forrester's guidance, but feel bound to call attention to their really creditable exhibit.

International Exhibition, Edinburgh.

(*Concluding Notice.*)

With the cessation of the Scottish Parliament in 1707, Scotland ceased to have a separate political history. Notwithstanding the Union, it remained, in many respects, a distinct kingdom, marked especially by those characteristics the foundations of which are deeper than Acts of Parliament. By a long struggle with influences they refused to accept, the people were moulded into an independent nationality; and the circumstances which produced this result caused them to lavish their love on that which had cost them dear.

The Highland dress—old as the days of Fingal, and described by tradition as a fitting garb for heroes—is a relic of the past to which they have always fondly clung. Acts of Parliament have been framed to suppress it, and there was a time when—as after Culloden—it was certain death to be found wearing the tartan. But it still survives, and as of old it marked the difference between the Celt and the Saxon, so now—as the uniform is part of our army—it draws the line between Highland and Lowland regiments.

R. & H. B. Kirkwood, Thistle Street, Edinburgh, have gathered together the officers' accoutrements of most of these Highland regiments. They include both those in use before and after the recent changes in army organisation. They form an exhibit of exceeding interest, and one must have a dull imagination indeed to fail in realising the important part which these regiments have played in history.

On many a field of battle have the Highland methods of warfare set at naught the tactics of Marlborough and Turenne, and in many a wild charge have the Highlanders, with claymore and dirk, hewed their way to victory. In many lands, far removed from their native hills and glens, they have played their part in the history of our Empire.

The ornaments which compose the Highland dress have been taken as the foundation for a class of jewellery familiarly known as Scotch; and we cannot but feel that they have been fitly chosen as an abiding memorial of the feats performed by those who bore them on many a red field of battle.

The claymore, dirk, skean dhu, shoulder brooch and sporran, all now find their counterpart in articles of jewellery which readily find a market. An American recently asked the writer, "What is a claymore?" And great astonishment is manifested when in answer there is produced some old weapon—as may be seen in Kirkwood's case—rust eaten with blood drawn in the battles of the Rebellion.

The claymore—*claidheamh-mor*, or great sword—formed an indispensable article of the Highland dress. It is still carried by officers of Highland regiments. It is usually reproduced in the form of a brooch, and occasionally as a paper cutter. The basket hilt, which gives the fine balance to the original weapon, is in miniature, inlaid with pebble or red enamel. When some ancient pattern is followed, it forms an ornament of exceeding beauty.

Next to the claymore, the dirk was the most deadly weapon the Highlander carried. It is a comprehensive instrument—the large blade being used for attack and the small ones as a knife and fork. It is commonly reproduced elaborately inlaid with pebbles and cairngorms, and it forms both the most attractive and the most saleable ornament of this class.

The skean dhu—*sgian dhu*—was the small knife carried in the folds of the hose. It is often sold and used, without any departure from the original size or form, as a paper cutter.

In the brooch used for fastening the belted plaid at the shoulder have been preserved to us some of the finest specimens of Celtic ornament we possess. Messrs. Kirkwood's collection is specially rich in full-sized replicas of these brooches. Some possess great historical interest, as, for instance, that one familiarly known as the Lorn brooch. In the encounter between Robert the Bruce and the McDougalls, the king only escaped, after slaying his antagonists, by undoing his brooch and leaving both it and the plaid in the hands of the dying chieftain. The original is still preserved by the McDougalls of Lorn, as a memorial that the celebrated monarch narrowly escaped falling into the hands of their ancestor.

An examination of these brooches reveals some curious facts as to the position of art in Scotland during Celtic times. Some people have thoughtlessly argued that the crudest and roughest form of art is the most ancient; but the history of nations, and especially of our own country, has shown that a people may reach a high state of civilisation and that their art may afterwards degenerate, or be almost entirely obliterated. No better illustration of this could be found than in some of these brooches. We might mention the most remarkable of them: the Tara, Hunterston, McLaine of Lochbui, Campbell of Glenlyon, and McGregor brooches. Their decoration is most frequently confined within panels and consists of a filigree tracery—formed of beaded wire—so delicate that a powerful glass is necessary for a thorough examination of their design. These brooches are reproduced both in gold and silver of all sizes, and form ornaments which the repeated changes of fashion assail in vain.

The sporran, or spóran, is the Highlander's purse. The purse has been a necessity in all ages. The Romans slung them from their necks with a strap or cord. In later times they were fastened by a loop to the waist. The Highlanders wear them suspended in front of the kilt by a strap which passes round the waist. They are made of leather covered in front with goat, otter or badger skin with simple tassel fastenings, or of silver with ornamental tassels. A magnificent collection of these is to be seen in the Exhibition. Of all the Highland ornaments this is the most seldom copied for the purposes of jewellery—the only form we recollect noticing being that of a vinaigrette with the tassels inlaid with cairngorm.

A most varied assortment of these articles in miniature is to be seen at the stalls of Mr. Westren, J. Robertson & Son, and W. Marshall & Co., while the originals may be conveniently examined in the adjoining case of R. & H. B. Kirkwood.

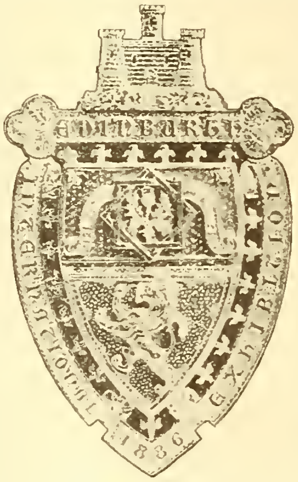
There is another class of jewellery also known under the designation of Scotch—that of inlaid pebble work. The manufacture of this was originally an industry peculiar to Scotland, and one of no mean importance; but in recent years it has declined alarmingly. Whether that is owing to change of fashion, or to the keen competition of Birmingham manufacturers, it is difficult to determine.

While the taste for inlaid pebble work may be questionable, and one that fails to meet the requirements of this æsthetic age, it is unquestionable that the increased demand for ornaments of fine-coloured cairngorm, mounted in artistic settings, is a step in the right direction. A fine selection of these is displayed in the cases of David MacGregor, Perth, and W. Marshall & Co., Edinburgh. The settings of these stones are confined by no means to Celtic patterns, although these predominate. The saw-pierced settings, which David MacGregor adopts, shows the stones to much advantage.

Time would fail us to note all the varieties of Scottish jewellery, &c., shown in the Exhibition, but we conclude by a reference to the fine collection of rams' heads, mounted as snuff mulls and cigar boxes, shown in Kirkwood's and Robertson & Son's cases. The ram's head is a familiar ornament on mess tables, and at Highland gatherings in all parts of the world. The elaborate and artistic manner in which many of them are mounted renders them most suitable as table ornaments. The jolly convivial days of old—still lamented by some—which gave them birth, have long since passed away. Like punch bowls and snuff mulls they still survive, and are occasionally sold to be used as tokens of friendship and good feeling, and in memory of "Auld lang syne."

Edinburgh Exhibition Badge presented to the Queen.

We have been favoured with an illustration of the badge executed by Mr. David Macgregor, jeweller, of George Street, Perth, presented to Her Majesty as a souvenir of the Edinburgh Exhibition. The badge is cut out of the finest gold, and is very massive and handsome. Its design is a Gothic shield, charged on the lower part with the Scottish Lion rampant in a double trassure. The upper part is charged with the official shield of the Exhibition, the interlaced double quadral lateral enclosing a thistle. The motto of the City of Edinburgh is represented on a scroll flowing from either side of this insignia. Surrounding the shield is a row of *fleur-de-lis*, reaching from the centre. On the top is a horizontal bar, bearing "Edinburgh" cut in relief, finished at the ends, where the bar expands into bays, with a thistle, also in relief. A representation of the escutcheon of Edinburgh, the Castle on a rock, surmounts the bar. The extreme of the design is surrounded by an embayed ribbon scroll bearing the words "International Exhibition, 1886." The whole jewel, which may be used as a brooch, is cut from the solid gold, instead of being, as in most cases, chased with the hammer and tools. It is, consequently, a very artistic piece of workmanship.



The Relative Value of the Precious Metals.

The following is the Treasury Minute which the Chancellor of the Exchequer laid on the table of the House of Commons, on the 6th ult., as to the appointment of a Royal Commission to inquire into the recent changes in the relative values of the precious metals :—

"The First Lord and the Chancellor of the Exchequer call the attention of the Board to the third report of the Royal Commission upon the Depression of Trade, recommending that a special inquiry into the group of questions which relate to the currency should be set on foot, and conducted under an order of reference carefully prepared so as to include all branches of the subject.

"The necessity for such an inquiry as the Commission suggest is confirmed by the evidence of anxiety widely felt both here and in India; and the First Lord and the Chancellor of the Exchequer, considering that the advice of the distinguished men who constituted the Commission is entitled to the utmost consideration, propose to advise her Majesty to issue a Royal Commission of Inquiry into the recent changes in the relative values of the precious metals shown by the decrease in the gold price of silver.

"It would be the duty of the Commission to investigate the causes of these changes, and especially to inquire whether they are due (1) to the depreciation of silver, (2) to the appreciation of gold, or (3) to both causes. If they should find the changes to be due to the depreciation of silver, they would then inquire whether such depreciation arises from increase of supply or diminution of demand, or from both; and they would endeavour to ascertain the proportions in which these different causes have operated. If they should find the changes to be due to the appreciation of gold, they would inquire whether the appreciation arises from the diminution of supply or from increased demand, or from both; and they would endeavour to ascertain the proportions in which these different causes have operated. Having regard to those different causes and their respective effects, they would next inquire what has been the bearing of the changes in the value of the precious metals on the following matters of practical business :—

"I. India.—(*a*) Upon the remittances of the Government of India (1) for payments on old or fixed contracts; (2) for payments on new or current contracts. (*b*) Upon the persons in India who have to make remittances home in gold. (*c*) Upon the producers, merchants and taxpayers of India. (*d*) Upon merchants and manufacturers at home who trade with India.

"II. The United Kingdom.—(*a*) Upon the trade of the United Kingdom with other silver-using countries. (*b*) Upon the foreign trade of the United Kingdom generally. (*c*) Upon the internal trade and industry of the United Kingdom.

"If the Commission should come to the conclusion that the aforesaid changes in the values of the precious metals are causing permanent or important evils or inconveniences to any of the interests above referred to, it would be their duty then to inquire whether it is possible to suggest any remedies within the power of the Legislature or the Government by itself, or in concert with other powers, which would be effectual in removing or palliating the evils or inconveniences thus caused, without injustice to other interests and without causing other evils or inconveniences equally great.

"Lastly, if the Commission are of opinion that this is possible, they will state the precise form which such remedies should take and the manner in which they should be applied."

Mother-o'-Pearl Shells.—Extensive supplies were brought forward at the auctions held on 10th August, the total amounting to 2,345 cases 658 casks 718 bags (not including Shark's Bay and Linga). Importers were generally willing sellers, and, with a better demand than expected, the bulk was disposed of at rather lower prices. A large supply of Sydney met a good demand, and was all sold at steady prices, excepting for thin medium, which declined about 10s. per cwt. An unusually heavy supply of Fremantle, &c., proved in excess of the demand, and prices gave way 5s. to 10s. Black edged were difficult of sale, and nearly all bought in. Shark's Bay sold readily at dearer rates. Particulars of sales :—833 cases 9 boxes 5 casks 28 bags Sydney were all sold : bold and medium, fair to good chiefly clean, £7 7s. 6d. to £8 2s. 6d.; partly defective, £7 to £7 5s.; thin medium selected, £8 7s. 6d. to £9 2s. 6d.; yellow edged, £8 2s. 6d.; chicken, £8 2s. 6d. to £9; bold wormy defective, £4 to £5 5s.; dead, 20s. to 60s.; pieces, £4 7s. 6d. to £6 2s. 6d. Of 527 hogsheads ($4\frac{1}{2}$ to $5\frac{1}{4}$ cwt. each) 16 casks 74 cases 51 bags Fremantle, &c., about 135 hogsheads were bought in, the remainder sold : bold and medium, chiefly clean shells, at £6 15s. to £7 5s.; a few packages, £7 10s.; Port Darwin character, £6 10s. to £6 15s.; thin medium selected, £7 17s. 6d. to £8 5s.; chicken, £8 5s. to £9 2s. 6d.; bold defective wormy and blistered, £3 10s. to £4 12s. 6d.; dead, 20s. to 70s.; pieces, £5 to £5 17s. 6d. 524 cases 28 casks 6 bags black edged went off as follows :—504 cases Auckland, &c., bought in or withdrawn, except 40 cases which were sold : medium and small, 77s. 6d.; broken, 37s. to 47s.; blistered, 14s. to 30s. 27 casks 4 bags Tahiti withdrawn. 6 cases 1 cask Fiji sold : bold and medium, 52s. 6d.; small and oyster, 36s. to 42s.; dead, 10s. 36 hogsheads 121 cases Shark's Bay sold at 28s. to 39s. 13 cases 25 bags Linga of old import sold at 4s. 9d. to 5s. 3d. per cwt.—*European Mail.*

Indian Jewellery.

A VISIT TO A DELHI ZENANA.

By WILLIAM SIMPSON, R.I., F.R.G.S., Hon. Assoc., R.I.B.A.

ZENANA is the word generally used in India for that part of the house occupied by the women, and is the equivalent of the more familiar word harem. If any one of my own sex were to say that he had visited such sacredly guarded quarters, I should expect some explanation to accompany the statement. A visit to a zenana on the part of a man would appear to my mind as a relation belonging to the "long-bow" character of stories, unless it had been told by a hakim or doctor, and in such a case the glimpses of the interior and of its inmates would have been of the slightest and most fragmentary kind. Such being the case, it becomes necessary that I should give some explanation regarding the method by which I accomplished this visit. The first statement that I have to make will remove the greatest difficulty from my story—the people were not orthodox followers of the Prophet. There is in Delhi a well-known family of the name of Skinner. The first of the family married a Rajpootni, a strict *purdah* lady—that is, she would not show her face to any man except her husband or son. They lived happily till the children grew up, and the father determined to give his daughters a European education, which implied that they should not remain under the seclusion of the *purdah*. This, according to Eastern ideas, was a degradation, and Rajpoots are credited with rather extreme notions regarding honour; in this case, the mother was so much affected by the supposed dishonour of her daughters, that, according to the story, she killed herself with a dagger. This is a very old story, for the eldest son organised a cavalry regiment, in the time of Lord Lake; it is now the 1st Cavalry, and is still known as "The Yellow Boys," a term applied to them at their formation, from the colour of the uniform, and which the corps still wear. This son, after the fall of Bhurtpore, was made a C.B., and received a large jaghire, or landed estate. His sons were still living in Delhi when I went there about twenty-five years ago. One of them was married to a Cashmere lady, who lived in pure native style, but, as she had been accustomed to receive her husband's friends of both sexes, her notions about the sanctity of the *purdah* had changed, and were not exactly the same as those of her grandmother-in-law.

When in Delhi at that time, I made inquiries as to the possibility of getting sketches of Mohammedan female costume, and I was most kindly invited by Major James Skinner, of the family above described, to his house. His wife and a grown-up daughter were arrayed in their best—what that meant may be so far understood by stating that each of the ladies had about £4,000 worth of jewellery upon them. Another way of expressing it may be given by saying, that, as I was anxious to draw every detail of this jewellery, I found one day was not sufficient, and I had to devote a second day to the work before I completed it.

I had the notion that the privilege of making sketches under such circumstances was a favour conferred on myself; but from the great interest taken in the event, rather an unusual one in a place like Delhi—and more so then than it might be now—and the great satisfaction that was evident on the part of my models, I rather suspect that the favour was viewed from the opposite direction by them. It seemed to be quite an event to them, and their delight at being sketched was made clearly manifest. A carriage, drawn by a couple of large prancing bullocks, was sent to bring me to the house; a substantial breakfast was waiting my arrival, and every delicacy they could think of was provided while I was in the place. Dancing girls were sent for to sing and *nautch*, so as to complete the character of the place, and to supply me with a perfect idea of Indian life and customs.

The two ladies sat on rich carpets, with guddis, or cushions, to lean upon. There was a large staff of attendant girls around them; these were of nearly all ages, many of them being old servants of the house; some had *punkahs*, or fans; while all were ready at a word or sign to obey the wishes of the Begum and her daughter. I understood that the whole was got up exactly in the style of the ladies belonging to the palace; and I know that the ladies of the Skinner family were on visiting terms with the inmates of the Imperial zenana, and I saw no reason to doubt but the correct form in every detail would be followed in what was before me. I mention all this, as it will indicate that the descriptions and sketches I have to give are not from the fancy, but are faithful representations of the jewellery worn by what might be called the best society in Delhi, the old Imperial capital of the Moguls. Novelists and painters in treating of such matters, have—from want of better information—dealt with them in a broad general style, but here you can see the exact shape and form of everything. I have often seen the "Light of the Harem" in pictures—this used to be a favourite subject with artists—but in no instance have I seen anything that had the slightest resemblance to truth in it. I will here mention one bit of detail. Before the ladies there were on the floor two large, highly ornamented, silver vessels, one about 18 inches and the other about 2 feet, in diameter, with lids to them. These were "pawn-dans" (fig. 1), and contained the morsels of betel-nut, wrapped up with a small quantity of lime, in pawn leaves. The "Light of the Harem" has some of this compound always in her mouth, and the result is a saliva of a bright red colour, which requires the constant use of a spittoon (fig. 2); and these articles, in silver and ornamented, stood at a convenient distance, for the hand to reach when required. The articles, connected with this custom, are so constantly required that no picture of a harem would be complete without them; and I give slight sketches to show their character, and being specimens of silver work, they are not inappropriate to the pages of this journal. The *hookah*, although often in request, did not appear as one of the constant surroundings of the ladies.

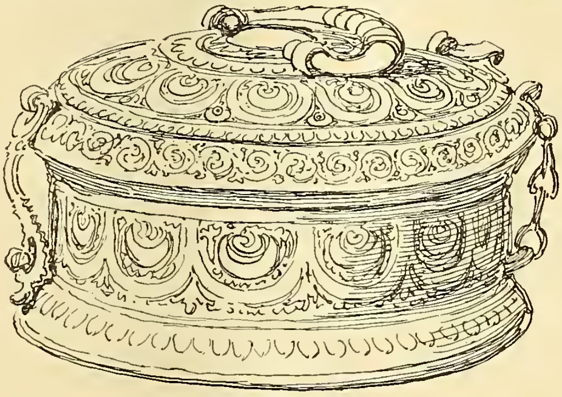


FIG. 1. PAWN-DAN.

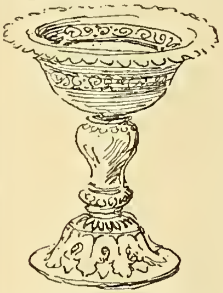


FIG. 2. SPITTOON.

In the first place I will convey some notion of the costume worn by ladies of position in Delhi. This is very limited in quantity. A small silken vest, trimmed with gold edging, merely covers the breasts; the sleeves are short, reaching about half-way down to the elbow. The principal garment is a pair of *pyjamas*—the word meaning literally "leg-clothes"—is used in India for all articles of dress which we should call trousers. Those worn by the ladies were so wide and long, that I never suspected they were what would now be called the "divided skirt;" it was only when my servant bought a pair for me in the bazaar, that I fully understood the character of the garment. Between the very small vest and the pyjamas there is a pretty large hiatus in the costume, which might rather astonish a European lady, but then the climate has to be remembered, and that the dress I am describing is that of "*purdah log*." To a certain extent this is covered by the *chuddar*, but those worn by the two ladies I saw were so transparent, that I may say they concealed nothing. The word "*chuddar*" simply means "sheet;" ladies in England will know the word from the Rampore Chuddars—generally misspelled in the shops of Regent Street as "Chuddahs." This word is used for the sheet with which a woman in India covers her head and the upper part of her person (fig. 3). The elder of the two ladies wore one of green gauze, with strips of gold through it. I give a slight sketch of this lady, which will give some faint idea of her general appearance. The pyjamas, it will be seen, are worn very low—no "suspenders" are used—a piece of silk, called a "*kummer-bund*," passes through a wide hem, and is tied in front. I mention this hem, as it forms a sort of girdle, and is often enriched with jewels. It is told of Dost Mohammed Khan, that in his early days, in Herat, in one of the struggles so common to Afghanistan, he entered the zenana of Prince Kamran, and tore away the jewelled girdle of the pyjamas belonging to one of the ladies, an article reputed to be of great value, from the jewels said to have been on it. This act was considered odious, even in Afghanistan. We may suppose in such a case it was not the plundering, but the plundering under such conditions which constituted the guilt.

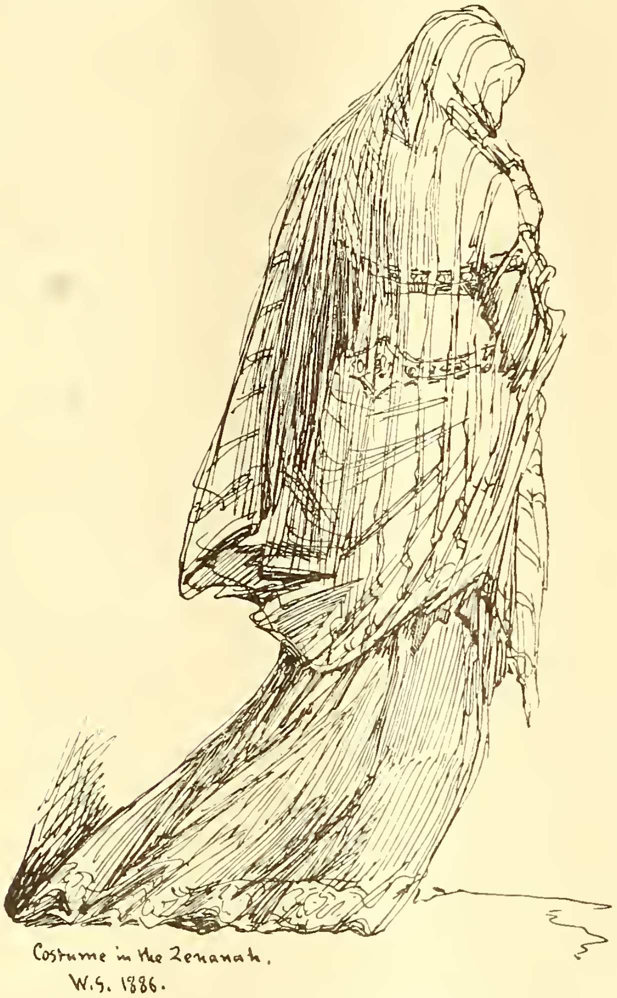

Costume in the Zenanah.
W.S. 1886.

Fig. 3. Costume in the Zenana.

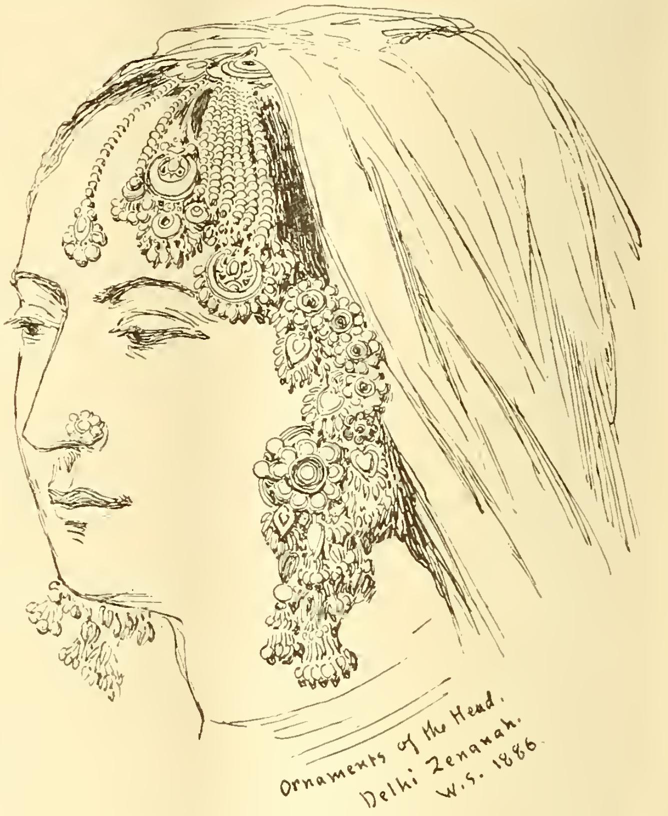

Ornaments of the Head.
Delhi Zenanah.
W.S. 1886

Fig. 4. Ornaments of the Head, Delhi Zenana.

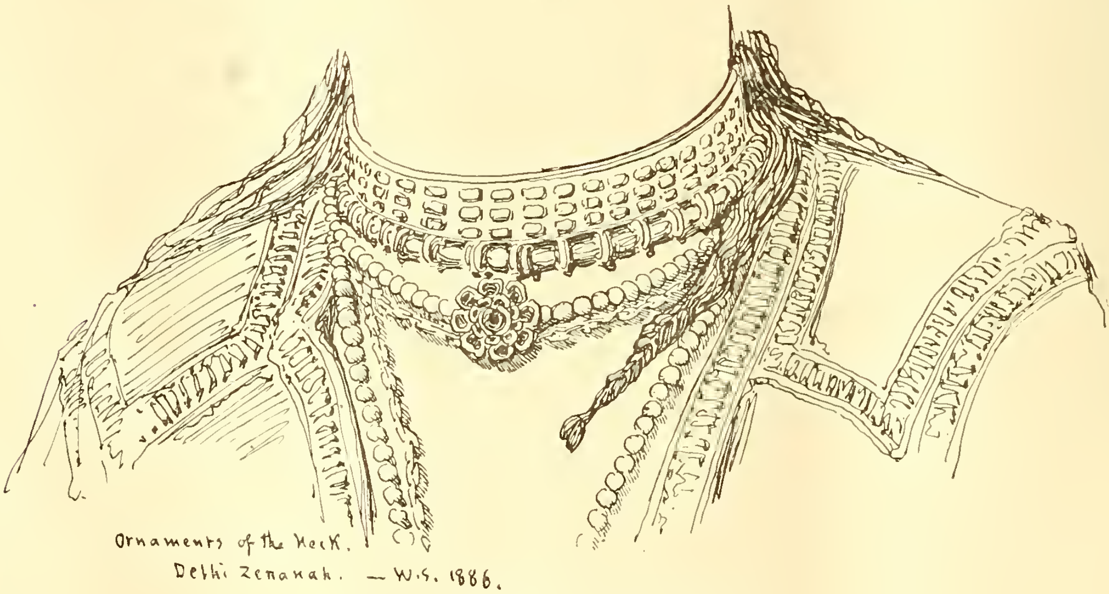

Ornaments of the Neck.
Delhi Zenanah. —W.S. 1886.

Fig. 5. Ornaments of the Neck, Delhi Zenana.

The jewellery worn by the ladies of the zenana began at the crown of the head. Here were fixed some pieces of gold, but being only partially seen, as the chuddar to a certain extent covered them, I cannot tell how they were fixed. I think the principal piece of gold was in the form of a crescent, and to its outer rim were attached a number of strings of small pearls; these hung over the left side of the forehead, and attached to them was a rich cluster of jewels. These came in contact with the mass of jewellery which surrounded the ear. The glittering mass seemed to form a beautiful

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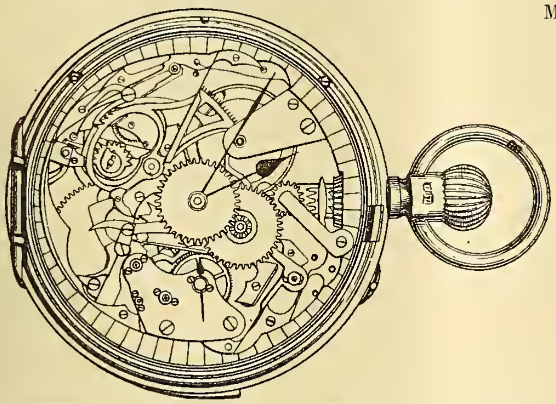

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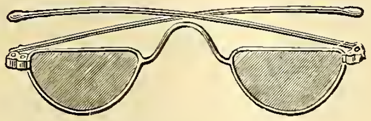

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cascade of gems, streaming from the top of the head down to the neck, the whole gleaming with colour produced by the gold, the rubies, firoozehs (or turquoise), emeralds, and stones of various descriptions. One string of pearls came down in the centre of the forehead, to which hung a small crescent set with rubies, and on the outer rim were attached pearls, hanging as drops. The other pendants to the strung pearls were for the most part similar; they were golden crescents, variously set, with pearls or precious stones of one kind or another hanging round the outer circumference.

It is the custom in India for women not only to pierce the lower lobe of the ear, but also to make a number of holes all round that organ. These holes are, by means of pieces of bamboo, widened to a considerable size; the object of this is to allow of a jewel being inserted somewhat in the same manner as a stud is placed in a cuff: the larger disc is of course in front, and this is inlaid with gems, generally in a rosette pattern. It will be seen in the sketch of the lady's head (fig. 4) that there are half-a-dozen of these rosettes which go all round the ear, the largest one being at the lowest part of it; the outer row of stones in this jewel were turquoises. Inside of this and touching the cheek is a gold ring on which there are two pearls and a small emerald between them: this last is a very common arrangement in Indian jewellery. Attached to the rosettes are a number of heart-shaped jewels, with drops of pearls and precious stones of all kinds attached to them. Under this mass of ornament the ear itself is completely concealed.

Not only is the ear pierced, but it is also the custom to pierce through the left side of the nose, and a ring is often worn here. Only the elder of the two ladies I saw had a nose jewel; it was a small rosette formed of pearls.

Round the neck was a collar of solid gold, set with three rows of turquoises: below that was another golden necklace, formed of discs and small cylinders. On the breast came a string of pearls, to which was attached a large rosette, set with rubies: connected with this is a gold chain, which was probably connected with this jewel to ensure its safety. The little vest already described is partly shown in the sketch here given (fig. 5) of the ornamentation of the neck; it was of green silk, and trimmed with a gold lace, common in India, which has a peculiar kind of glitter about it.

The wrists were ornamented with a number of bracelets; the uppermost of these was a heavy one of gold, set with five rows of turquoises. Next to this comes two small discs, but I cannot now remember whether they were separate articles or attached to the bracelet already described. Close to these were two rows of gold beads, then a golden bracelet set with turquoises, and lastly a thin golden disc (fig. 6). The fingers were not overburdened with rings; still the hand which I sketched, and which is here reproduced, had no less than ten of them upon it, the peculiarity here being the connecting chain from the ring on the fore to another on the small finger. Another peculiarity is the thumb ring: this has on it a small circular mirror, about an inch in diameter, surrounded with pearls or gems; by means of this the lady can get a sufficient glimpse of her face in the reflection, to see that all is right, and that the different articles of ornament are hanging in their proper places.

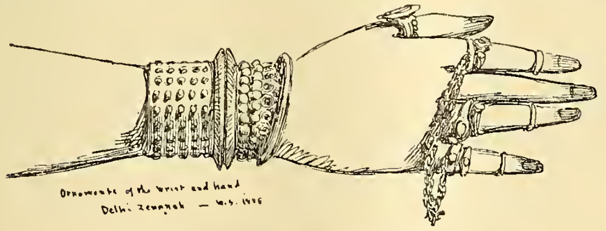
Ornaments of the wrist and hand
Delhi Zenanah — W.S. 1886

Fig. 6. Ornaments of the Wrist and Hand, Delhi Zenana.

These ladies had also used the usual application of henna to their hands (fig. 7); the nails were tinged by it, and when used it is either ground or at least spread out on a smooth stone, on which the palms of the hands are laid, and a slight movement is given—the result is an impression of the bright colour all over the palm and fingers, but it is not quite regular in its outline, owing to the undulations of the muscles of the hand. It was the old Hindu practice to go through the same process with the soles of the feet. (I have a small marble statue of Krishna; it is carefully coloured, and the red is shown as here described.) In my visit to the Delhi zenana I never saw either of the ladies' feet, the long skirt of the pyjamas completely covered them; but I should suppose it as most probable that their soles would be coloured according to the custom of the country. I also presume that bangles would be worn, but in this point of detail, for the reason given above, I can say nothing.

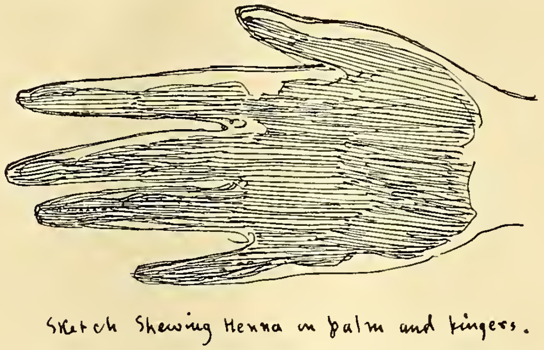
Sketch Shewing Henna on palm and fingers.

Fig. 7. Sketch showing Henna on Palm and Fingers.

(To be continued.)

Paris Notes.

From Our Correspondent.

Paris, *24th September*, 1886.

I NOTICED in a recent issue of *The Watchmaker, Jeweller and Silversmith* a paragraph cut from our French contemporary, *Le Moniteur de la Bijouterie et de l'Horlogerie*, in which it was stated, under head "Freak of the Silver King," that Mackay was about to paper a room in his house with European bank-notes. Judging from my knowledge of Mr. Mackay as a business man, I should say he was the last person in the world who would be guilty of such foolish waste. I once heard him bargaining for a pair of ponies at a horse-dealer's in the Avenue de la Grande Armée, as if, instead of being a millionaire, he was a man of limited income. Bank-notes paper his portfolio, but his walls never.

* * *

The Parisian trade regrets the removal to London of the Silver King and his Queen. In the winter, when parties were given at the hotel in the Avenue Friedland, there were some good orders placed for golden and silver medallions, fan-holders and other presents in jewellery for distribution at the *cotillon.*

* * *

The French Minister of Finance has called in the small five-franc pieces in gold, which will finally cease to have currency at the end of this year. This is an excellent measure, as these gold coins were not only so small as to be very easily lost, but being exactly the same size and shape as the fifty-centime pieces, were frequently given away for one-tenth of their value. I remember that one night I gave a cabman four gold five-franc pieces instead of four silver half-francs.

* * *

The fashionable *porte-bonheur* in Paris is to-day the *gri-gri*, which was introduced by the African chieftain, Prince Karamoko. The gri-gri is an antediluvian insect which is only found embedded in pieces of amber, being visible through the transparent substances. Pieces of amber containing this insect are now set as lockets, rings, trinkets and brooches. The gri-gri is a fetish in Africa, and superstitious Parisians fancy that it will have the same powers for good in France.

If one of the ideas of my friend, Mr. Oscar Wilde, takes definite shape, it is probable that good business will result for London jewellers. He thinks, namely, of setting the fashion of wearing a jewel, set or plain, at the button-hole instead of a flower, at evening parties and dinners.

* * *

The taste for moderately-priced fancy clocks seems to be growing in Paris amongst a certain class of society. A watchmaker in the Rue de Rivoli makes a very good show of this class of goods, for which, however, I have, personally, very little liking. His show attracts numberless passers-by, and no doubt this is his object in displaying these theatrical articles side by side with goods of real artistic value. Windmill clocks, steam-hammer clocks and steam-engine clocks are familiar objects enough, but there are novelties in the way of revolving lighthouse clocks, and there is also a specimen of a clock shaped like the stern of a ship. The man at the helm sways from side to side in a hopeless and imbecile manner, and the wheel moves in a way that would strike despair into the heart of a skipper or naval instructor. The *mise-en-scène* of this massive piece is most complete—cabin, steps, rigging and bulwarks are all there—and there is, besides, another figure—the figure of a sailor—apparently engaged in playing cat's-cradle with a coil of rope.

* * *

A remark which I overheard as I stood outside this shop, the other day, from a workman, who had been eyeing the show with some contempt, sums up the principal fault of these clocks which are intended to represent models of engines of great power. "One could stop it with a breath, that twenty-ton steam hammer," he said. It is a fact that these models suggest anything but that power which is the beauty and attraction of steam engines.

* * *

Apropos of toy clocks, my friend and colleague, Mr. Albert Bataille, who is in Bavaria, visiting the seven palaces of the luckless late King Louis II., writes from Herrenschiemsee of a marvellous specimen of this branch of the horological art, which stands in the Salle de Conseil, or Throne-room, in this wonderfully gorgeous castle. This clock, which was manufactured in France, stands on a table of lapis lazuli opposite the throne. Whenever the hour strikes, folding doors open beneath the dial, and a figure of King Louis XIV. of France, in gala dress, comes majestically stalking out, followed by his courtiers. These bow to him the number of times that the clock strikes, and then the royal procession turns round and stalks majestically back through the golden doors.

* * *

In the hall of the same palace is a wonderful piece of the silversmith's art. As you enter the great vestibule from the terrace outside, you see facing you a gigantic peacock, with outspread tail fully three-and-a-half yards high. This royal bird stands on a pedestal of violet marble. Its body is of bronze and its throat is of chiselled silver. The feathers of the body have the exact appearance of the natural plumage of the bird; but it is in the outspread tail that the work is of the most consummate art. Each of the eyes is of silver, enamelled in the colours of their lovely, natural splendour. This work of art alone is worth a prince's ransom.

* * *

I am informed on good authority that the jewel market is being flooded with very skilful false stones from Belgium. These are so perfectly imitated that none but experts can discover their ungenuineness. The stones are principally sapphires. I may have something more to write about them on a future occasion.

* * *

At the International Scientific and Industrial Exhibition, which is now being held at the Palais de l'Industrie here, there are some exhibits of horological and jeweller's work which are sufficiently interesting to be noted upon, though, on the whole, the Exhibition, as far as our trade is concerned, is a disappointing one.

In the centre of the hall stands a very elegant pairlieu, bearing the name of the Taillerie Française de Diamants de M. Charles Roulina (Mr. Charles Roulina's French Diamond-Cutting Establishment). This pairlieu is of glass, with a framework of black wood; it is elegantly carpeted and furnished inside, and all round the room are machines and employés at work, showing a much interested public how diamonds are cut. Photographs exhibiting the scenes of the principal diamond fields in Brazil and at the Cape, and of M. Roulina's works at Rio de Janeiro, are hung up, and there are also interesting showcases of diamondiferous rock and clay to be looked at. Two Cape diamonds, weighing respectively 69 and 112 carats, beautifully cut, and coming from Beer's Reef, are placed as the central attraction in one of these cases.

* * *

The next stall that I visited was that of Armand Schwob and Brother, manufacturers of watches of all kinds for all countries, of 19, Boulevard Bonne-Nouvelle, Paris, and of Chaux-de-Fonds, Switzerland, where their factory is. The display here was quite up to Messrs. Schwob's usual mark. One article, of which I took special notice, was a very elegant gold rose, tastefully carved, in the centre of which was a tiny watch, about the size of a threepenny piece. The rose formed a brooch or clasp. The showcase was full besides of the new handless watches, which, however, I hear are not taking very well in France at least. The other articles exhibited by this firm call for no special remarks.

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One of the attractions to a working watchmaker will certainly be found in the new mysterious clock which has been invented by a young workman, M. Henri Cunge, and models of which are exhibited both at the International Scientific and Industrial, and the Working Men's Exhibitions. This clock is called by its inventor *La Transparente*, and though the first idea of a mystifying piece of horological work was doubtless inspired in M. Henri Cunge by the "mysterious clocks" of Messrs. Robert Houdin, Eadot and Robert, all of which were formed of a dial of transparent crystal, with the works skilfully hidden away in the foot of the apparatus, or, as in the Robert clock, in the hands themselves, the system of all of which has been fully explained by M. Gaston Tissandier, in his work called *Les Recreations Scientifiques*, yet this new model has all claim to original and independent interest.

* * *

La Transparente is composed of a thin C-shaped copper stand, which supports two hollow glass balls, the lower one, which is marked with the hours and subdivisions for the half and quarter-hours, being considerably larger than the upper one, which is marked with the minutes. These two balls rotate on steel pivots, before fixed indexes. The minute index is formed by an arrow-shaped prolongation of the C-shaped stand, which curves over the upper ball; the hour index is formed by a copper figure, which stands in front of the apparatus, and which represents a man holding a lance in his hand. The point of this lance is on a level with the circle of figures.

* * *

It was quite impossible for me, though I carefully studied the model, to solve the enigma of its working. The globes, as I have already stated, are perfectly hollow, and as transparent as a soap-bubble.

* * *

A jewellery shop has been opened on the Boulevard de la Madeleine, where pledges redeemed from the Mont-de-Piété, or public pawnbroking establishment, are offered for sale. The firm lends money to people who wish to redeem pledges, and keeps the pledges as a guarantee of repayment, selling them after the lapse of a certain time. I really confess I am unable to see any advantage—except to this firm—in this much advertised and much recommended system. It seems to consist in changing creditors, the debtor having to deal with a private firm, which makes its own conditions, instead of with a Governmental and Government inspected and guaranteed public establishment—to my thinking, a decided change for the worse.

M. Alphonse Dècle, who makes a specialty of cheap lines, and issues each month a list of novelties, has also a stall at the Exhibition. One of its attractions is a pretty model of his principal workshop, executed by the apprentices in his employment. The names of some of his novel bijoux have at least the recommendation—a great recommendation in Paris—of actuality, as for instance, Hommage to Pasteur, Volapük, Anti-Phylloxera, and Bijoux des Contemperains. The reason why these names were given to very usual varieties of cheap goods is not very apparent.

* * *

Anything more horrible, in point of vulgarity of taste and downright ugliness, than the pendules artistiques (?) exhibited at 3, Boulevard Montmartre, it would be difficult to conceive. These artistic pendulums consist of large plates painted to represent some scene, such as a cathedral, a market-place with clock-tower, and so on. In the corresponding place there is, let into the plate which is adapted for hanging against the wall, a small worthless clock. This rubbish, which would be dear at 5 fcs., is tariffed from 50 fcs. upwards.

* * *

One of the attractions of the Avenue de l'Opera is the shop of Messrs. Howard & Co., of New York. In a future number I hope to be able to give a full description of the various artistic novelties in the silversmith's art which are exhibited here. Meanwhile, I would refer to a pyramid of watches manufactured by the Waltham Watch Company, which stands in one of the windows, a pleasing and attractive sight. In this window are also exhibited photographs of the various workrooms of this company's factory.

* * *

My further notes on the exhibits at the Exhibition, as well as other items of interest, I am obliged, from want of space, to hold over.

The History and Object of Jewellery.

By John Jones, F.R.G.S., &c.

(Continued from page 69.)

THERE is a constant agreement between architectural and personal ornament. The knowledge of the idea embodied in the former assists to determine the meaning of the constituents of the latter, and no style of ornament abounds more in modern jewellery than some form or other of the arabesque.

A still more important service to jewellery accrued from the Mohammedan era. Mohammed was versed in the traditions of the East, and availed himself of every principle they contained to make his religion acceptable. In all ancient religions colours were symbolical; they fix the attention and influence the feelings. The extraordinary power of many of the senses of savages shows that a judgment, as to the influence of colours, drawn from our own experience, might be incorrect. It is probable that a more vigorous service of the senses existed among early nations, nor is it unlikely that better modes of education would greatly increase their power among us. The control of nature over the soul was therefore proportionably strong; even in modern times the condition of the senses, as dependent on external nature, decides the customs of the country. In December's gloom Christmas festivities are held; the unkindness of the weather being the measure of social conviviality. In summer flowery fields invite to solitude and meditation; "sermons are found in stones, books in the running brooks;" the affections find objects in external nature, and in the general aspect of happiness man's spirit communes with the spirit of love. The brighter colours of flowers, the gayer plumage of birds, and the more marked character of the firmament and its orbs, must have more intensely affected the feelings of the native of an Oriental climate. Colours thus became a science with as definite laws as music, and by high authority were appointed to be the channels and incentives of those emotions which religion excites. Their significations were the same through all nations; light and darkness were the appropriate symbols of good and evil. The three primitive elements of light blue, yellow and red conveyed the ideas of truth, goodness and love to the fathers of the human race. In the sky and sun they were the constant records of Divine agency. The redness of the rising and setting sun was the promise of goodness, the appropriate emblem of love—"and blushed celestial rosy red, love's proper hue," says Milton. The yellow of its meridian power was associated with its productiveness and typified good. The unchanging blue of the firm vault of heaven signified constancy and truth. This, however, is but a collateral support, the true basis of the system is the agreement between our emotions and their influences. The triple bow, as Milton calls it, must have had a significance beyond what it now possesses; to the family of Noah it must have been a chromatic sonnet of celestial care. Adam, red, is the name given to the father of the human race. Except for some significance in colour, man's name would be an exception to those of animals—the description of their natures. The meaning of secondary colours was determined by the combinations of the primary, but did not convey equally noble sentiments: accordingly, in early Pharoanic tombs and palaces none but primary colours are traceable. In the Alhambra, where the motto, "Glory to God," interspersed through the decorations, shows the purpose of the builder, the same selection is observed. A visit to the Egyptian rooms of the British Museum will show the application of colours to the portraiture of their deities. According to the colours of the planets the Persians assigned to them good or evil influences. The Chinese Exhibition proves that colours are the tokens of rank in China. On the breast of each mandarin is an animal worked on the outer garment and enriched with a handsome border of scroll work, having the appearance of a breast-plate; the colours of the animals betoken the rank, probably the animal may do the same; the button and tassel on the cap is regulated in its colour by the same law. The three primitive colours prevail. Blue is an especial favourite, and the same signification is attached to them as has been already explained. Red was the Imperial colour of Rome, and death was the penalty for wearing it illegally, for it was regarded as overt treason. No people, however remote from the birthplace of civilisation, were ignorant of these principles of nature. In the remote isle of Mona the sun-worshipping Druids held their esoteric mysteries, and thence spread through Wales, England and Ireland their imposing ceremonies.

The golden stone was the stone of sacrifice. Gold is yellow, and represents the splendour of the sun, or divine goodness. The diocese of Clocher, or the golden stone, so called from a Druidical temple once having stood there, perpetuates the sanctity of gold as a religious symbol. These Druidical temples, it may be mentioned, were built circular, with a trench around them, giving rise to the fables of the enchanted rings; at the cardinal points were pillars, the entrance was through a collonade of nineteen stones, representing some astronomical epochs. In the Arab poem by Job, gold is more than once synonymous with the sun's radiance.

> "Within thy days hast thou ordained the dawn,
> And appointed the day-spring his post;
> That they should lay gold on the skirts of the earth,
> And evil-doers be terrified away from it."
>
> *Dr. Mason Good's Translation.*

Dr. Good confesses that he does not understand the meaning of the last two lines, and the commentator Reiske, on the same passage concludes, "*Fateor me non capere.*"

Regarding gold as the symbol of God's goodness, the difficulty vanishes. To the different grades of the Druidical priesthood were assigned colours indicative of rank. The Druids wore white—"The proud white garment which separates the elders from the youth," as Taliesin has it. The high-souled bards are described as wearers of long blue robes, and Taliesin again, speaking of the third class, the ovates, makes one of them say, "With my bright green robe possessing a place in the assembly."

The coat of many colours is still regarded in the East as a charm against evil. But in the gorgeous ceremonial of the Jews, the most perfect exposition of the principle is found: for glory and beauty is the reason added to the directions for the splendour of the service: glory referring to the ideas embodied, beauty to the senses. The minuteness of detail with which we are detained in reading the sacred writings belongs to the importance of the symbols.

"Gems," says Bacon, borrowing from Albertus Magnus, "are the gums of the earth, wherein appeareth the majesty of nature brought into a narrow room." They are the incarnations of colour, and hold therefore a conspicuous place in the priestly vestments. The fathers of the Church were read in ancient literature, their testimony is therefore valuable. St. Epiphanius, a native of Palestine in the third century, wrote a dissertation on the twelve stones in the breast-plate, assigning the opaque stones to the sons of the bondwoman, the transparent to the free, and further distributing each by colour to the corresponding tribe, concluding that the urim and thummin was a diamond which best answered the description of light and perfection; the whiteness of the diamond comprehending in unity all colours, thus being the type of universal intelligence.

Pope Innocent's letter to King John of England explains the meaning he attached to the four rings which he sent as a present to the King: "Gold," said he, "signifies wisdom; the green of the emerald, faith; the blue of the sapphire, hope; the red of the ruby, charity; the yellow of the topaz, good works." The painted windows of our churches and cathedrals are rich with this symbolic lore. St. John is dressed in green: green is the combination of blue and yellow; it typifies generation, and is thus illustrative of good works. The Virgin is dressed in blue, representing her spiritual life. If the wind blowing where it listeth be the fit image of the spirit—blue, the colour of the atmosphere, represents the spirit that leads unto all truth. In the Anglo-Saxon missals, the hair and beard are sometimes painted blue, and female locks are frequently coloured green and orange. Mr. Planche, in his work on costume, attributes this to error; the most likely explanation is its symbolism. Even now the Bedouin Arabs daub their faces with blue as a charm against evils. (For a fuller explanation of the science of colours, the reader is referred to *Mons. Portal sur les couleurs symboliques.*)

(To be continued.)

Mechanical Drawing.

By Robert Marshall.

(Continued from page 52.)

ALL the joints in compasses and bows should be readily adjustable, and the arrangements for the purpose should be substantial, and not of the flimsy character too often observed. The working stiffness of the joints should be such that they are not alterable by reason of the pressure on the paper in the act of drawing, but at the same time it must be such that they readily alter, when required, by easy pressure of the fingers. The pens, whether for compasses or bows, should not be too narrow in the blade, but fairly broad so as to carry a good volume of ink: frequent stoppages for the renewal of ink is an inconvenience to be avoided as much as possible, especially when tracing. These remarks apply also to the ordinary drawing pen. The pens of bows and compasses should always be kept sharp and in good condition. To sharpen a drawing pen properly requires much practice, it should not be tapered to a fine point—as in this condition it is apt to cut the paper—but should be nicely rounded off. The compasses are generally provided with a lengthening bar for drawing very large circles. Proportional compasses are sometimes useful instruments—the ordinary form, engine divided, are the best; they should be carefully tested before use. The rolling parallel ruler is far superior in every respect to its old-fashioned rival, and its use should be more general among mechanical draughtsmen than it is. No set of instruments is complete without dividers and a protractor. The dividers are compasses without knee-joints, both legs terminating in steel points; one of the legs is sometimes fitted with a fine adjustment screw, by means of which infinitesimal differences can be effected. The protractor, sometimes of horn, sometimes of metal, and occasionally of ivory, is generally half a disc or semicircle in form, the edge or circumference of which is divided into 180 equal divisions termed degrees, and these degrees are again divided into fractions. It is employed in measuring and dividing angles. The horn protractor is the cheapest, lightest and handiest form. The metals of which the compasses, bows, &c., are constructed are various, but that known to instrument makers as Electrum is preferable, requiring less attention and cleaning than brass.

Drawing scales are made of paper, of ivory, and sometimes of metal. The paper scales are very useful and have the advantage of expanding and contracting to the same degree as the drawing paper as the hygroscopic condition of the atmosphere varies. The paper scales are usually about 18 inches long, and are uniformly divided from end to end, thus necessitating a separate scale for each measure. The ivory scales are usually combination scales, containing eight different measures. For drawing the oval section is preferable, as the divisions of the scales can be held closer to the paper with this form.

Tracing.

Beginners should always commence on tracings; there is no better exercise in the use of instruments than this, and if patience be exhibited, rapid progress will be made. In tracing from a drawing, tracing paper and tracing linen are employed of a stoutness dependent upon the use the tracing is to be put to. Tracings to be sent by post, for example, are made usually upon the finest and lightest paper obtainable, while tracings for use in the workshop are executed upon the stoutest papers and linens. On tracing linen, or cloth as it is as often termed, the ink will not run freely of itself, and it becomes necessary to add a small quantity of ox-gall. Ordinary soap added to the ink will effect the same result. Another method of causing the ink to run freely on tracing cloth, is to powder some ordinary white chalk and to rub this well over the surface; after dusting the chalk off, the ink will be found to run freely. This is also observed on some of the thicker tracing papers, but here the only resource is ox-gall or soap. In tracing, the tracer should always begin with the bows, and put in carefully all the small circles and fillets at the ends or junctions of lines and circles, observing great patience and omitting none; after this the straight lines may be drawn by means of T square, set square and drawing pen, although many draughtsmen use the bows, just straightening the legs out. To draw straight lines with a compass pen requires some freedom of hand, owing to the form of the points, and is a practice not recommended to beginners, although it saves the time of changing instruments. In drawing circles with the ink compasses and bows, care should be taken not to press too heavily upon the instrument; it should be held as lightly as possible, and be gently inclined so as to turn by its own weight on the needlepoint. In drawing a complete circle, rotate the pen of the instrument from left to right continuously; never change the direction of rotation. Erasures are neatly effected on cloth, by wetting the line or circle to be removed by means of a camel-hair brush and clean water. Pass the brush lightly over the line and press clean blotting paper upon it; after the ink is fairly removed by this means and the cloth thoroughly dried, a piece of ordinary ink eraser will remove all trace of the error. Erasures are effected on paper by damping the line as before, removing as much of the ink as possible by means of the wet brush and blotting paper, and before the paper is dry rubbing it gently with soft indiarubber. It must be understood that the paper must be damp—not wet—when the indiarubber is applied.

Colouring and Shading Drawings.

Colour is used in drawings and tracings to convey the idea of the material intended to be used in the mechanism or structure as well as to give by shading an idea of form. When used to indicate material the colours are conventional and the intensities and shades vary according to taste. Cast-iron is indicated by a neutral tint, wrought-iron by Prussian blue, steel by a reddish purple, brass by gamboge, copper by crimson lake and sometimes by orange, white metals by a light green, and woodwork by umber and sepia, while stonework and earthwork is indicated by a light wash of umber and sepia.

In shading, to produce the effect of solid form, the light is supposed to strike the plane of the paper from the left-hand top corner at an angle of forty-five degrees. Thus, on a cylindrical object, for example, the high light will be nearer the left than the right-hand side, and the shadow deeper and broader on the right than on the left-hand side; the object will also throw a shadow from the bottom at an angle towards the bottom right-hand corner of the paper. These shadows are usually washed in first in Indian ink carefully, several light washes being preferable to one thick one; the tint must disappear towards the high light—it is effected by damping out by clean water, and requires much taste and practice. After the Indian ink wash is thoroughly dry, the character colour of the material it is intended to represent is laid on in their washes. A pleasing effect in shading can be obtained by making all the lines of a drawing bounding the right-hand side of an object, or defining its form on the right-hand side, thicker than those on the left, and by making the lines defining the form on the under side thicker than those on the upper side. When this method is adopted no colour is used, but often auxiliary shade lines are added; this is practised in the production of drawings for the Patent Office, for book illustrations, &c. The drawing instruments should be carefully cleaned after use, the threads of the screws oiled occasionally, and the springs kept from rusting.

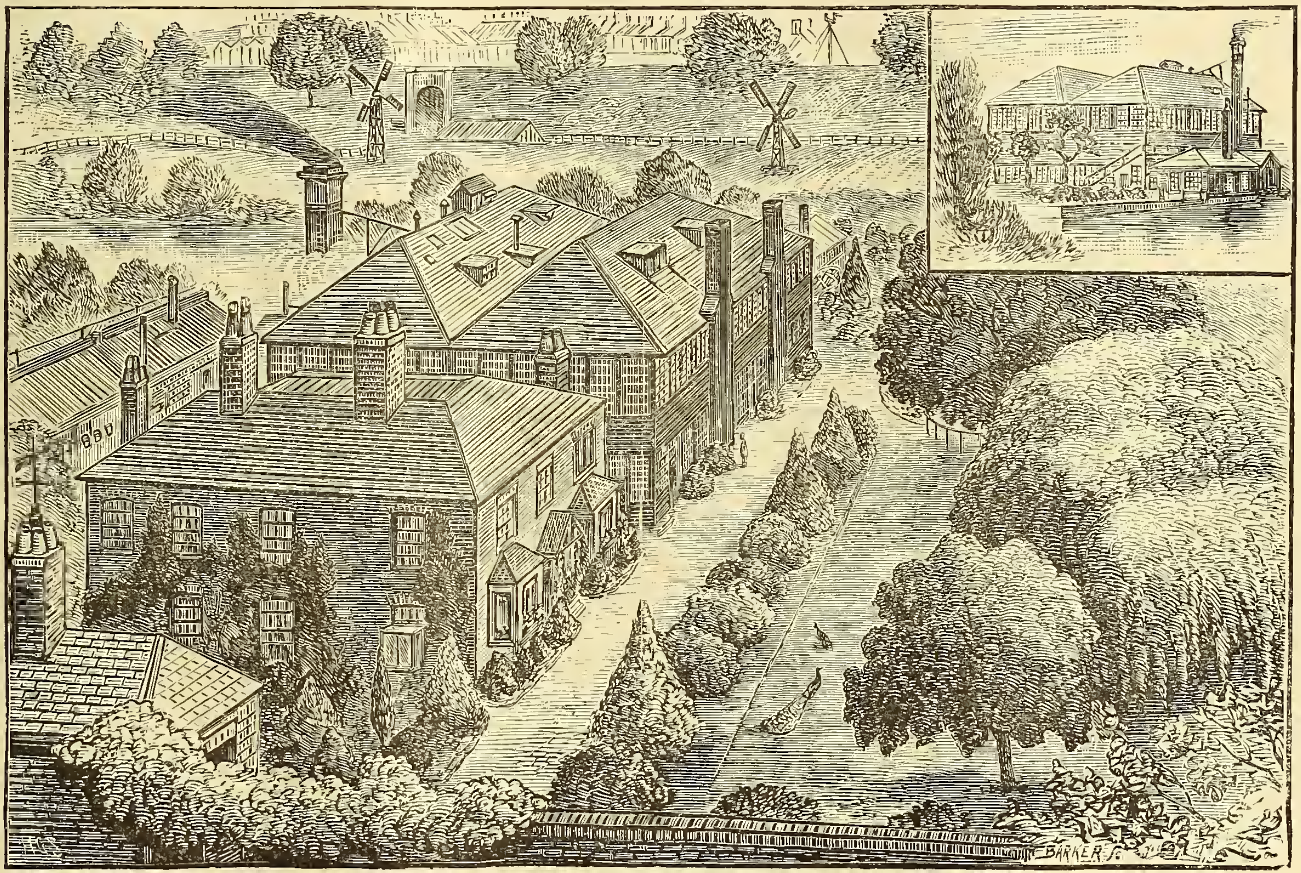
In mechanical drawing, nothing is more essential than a good stock of patience, without which nothing great can be achieved; and if the would-be draughtsman displays this quality in the application of the suggestions here offered, the result cannot be otherwise than satisfactory.

Robert Marshall.

The Spinners of Gold and Silver.

To raise an objection to the view enunciated by a certain Biblical authority, when he emphatically declares that "there is nothing new under the sun," is rendered quite unnecessary, owing to its evident rashness. The inventive genius of man appears unlimited, for, no matter in what direction we turn, mechanical and other marvels greet us; and the confession has to be made, that our knowledge is yet in its infancy.

Among the wonders of manufacture the preparation of gold and silver thread, for the diverse purposes in which it is an essential, is not the least of these marvels; and a recent visit we paid to the leading mills wherein this industry is carried on in an unpretentious, yet thoroughly systematic manner, has revealed to us many interesting facts of which the average individual remains in ignorance. The spinning of gold and silver, the "drawing" of the metals into a sufficiently fine thread to admit of their being ultimately wound around silk or cotton thread, is a process requiring the highest skill, aided by machinery of a complex and delicate construction. To enter into the entire *modus operandi* is beyond the space at our disposal, and we can but touch lightly upon the salient points as noted in a tour through the several departments.



"Silk Mills," Lewisham, S.E.

Taking the train at Cannon Street for Lewisham Junction the other morning, in a brief fifteen minutes the smoke of the mighty city was left astern; and, on emerging from the station, a short and pleasant walk brought us to the "Silk Mills," as they are termed and have been known for over sixty years. The situation of the property is most pleasing, as at the upper side a small lake laves the banks, and the water is utilised as part of the power required to propel the machinery, materially aided, however, by steam power equal to thirty horses. Externally there is an utter absence of those surroundings commonly met with in mills—the only active sign of the labours in the interior being the regular puffs of steam from two slender pipes running above the roof. There is no signboard; neither is there a name upon the massive gates, inserted in a high brick wall, forming the entrance. On being admitted within these gates a lodge-keeper sends your card to the office, and presently one of the genial proprietors is seen approaching, and your welcome leaves nothing to desire. Passing a double-fronted villa, facing an attractive lawn, and environed with shrubberies and flower-beds, the mills—built of wood—are reached. All the surroundings are scrupulously neat and clean; and from the windows of the cool and pleasant office the eye is gladdened by the brilliant hues of flowers, the waving of the branches of a noble weeping ash and other trees, as they are stirred by the breezes.

Going back for over a century-and-a-quarter of time, we find that the drawing of wires of gold and silver was prosecuted in this country under considerable difficulties, the French having, by dint of continuous and expensive experiments, perfected a method which secured them an almost entire monopoly in the line; and this in a measure was to be attributed to the invention of the perforated plates—through which the precious metals had to be drawn—composed of a combination of other and harder metals, of which they carefully retained the secret. Still, the desire of gain is always too great to prevent others benefiting from any marked improvement of this kind; and, by paying handsomely, the English succeeded in obtaining supplies from France, and, as years rolled on, solving the mysteries of the mode of blending metals for plates. At the present time the productions of England in the gold thread and lace line are fully equal, if not superior, in quality to those of France, and, in every way, ahead of German goods.

To manufacture gold wire a body of carefully-prepared silver—pure, with the exception of an alloy of copper to the extent of ten per cent., to add to its toughness—is necessary, and into this is worked absolutely pure gold, in leaves of a good thickness. The silver is received direct from the Bank of England, and is in cakes weighing about 3,000 ounces troy. These cakes, on arrival at the mills, are melted and cast—for greater convenience of handling—into ingots, weighing between three and four hundred ounces, and of a shape suitable for the first steps in "drawing." The entire process is highly interesting, and perhaps rendered more so by the quietude with which each particular stage of the work is carried on.

To such a fineness has the wire to be brought, that the latter stages of reduction in size have to be carried out by its passage through such precious stones as rubies, sapphires and diamonds; and so wonderfully blended are the silver and gold, that, to all intents and purposes, the wire is gold. At these mills one troy ounce of metal has been drawn so fine as to measure 20,000 yards, but 1,400 yards to the ounce is the average length drawn. There are several grades of each product of these mills, consequent upon the requirements of trade; but it is evident that the same care is exercised in turning out the lower-priced goods as is bestowed upon the most expensive—the enhanced cost being for a greater body of the precious metals used, to which may be added the cost of a more complicated, as well as a more delicate, series of manipulations.

Gold and silver thread, cords, braids, lace, with frosted thread—a most charming blending of colours, out of which ornamental work in flowers, sprays, &c., are made—comprise the leading lines of these mills, to which has been recently added the manufacture of wire, both in a straight and crimped form, for brushes to burnish cold gold as well as silver.

The hands employed in these mills are principally females; and the appearance of each employée would go to prove that the duties are neither arduous, unpleasant or unprofitable. The goods manufactured are ordered for nearly every country in the world; and despite commercial depressions, there is an evenness in the demand not often met with in other directions. The accompanying illustration, specially taken by our artist, gives a faithful representation of what may not inaptly be termed a bijou manufacturing concern of considerable importance.

Watch Jobbing.

By X. O. N.

(Continued from page 57.)

ALTHOUGH broaching in the mandrel is not a bad way of opening a hole, it is always better to open it to nearly the required size by running a cutter through it, if the hole is large enough to admit of this being done: but, as these cutters are easily broken, in consequence of their being so small, turning out holes is not often resorted to by watch jobbers.

The half-round or triangular pieces of steel sold with a mandrel to make cutters of are seldom made from the best steel, and are only fit for cutters for rough turning, and making a cutter of one of these involves considerable labour; therefore it is much better to make one into a cutter-holder by drilling a good-sized hole in one end of it, and after broaching the hole, fitting several pieces of small steel to the hole (they should be turned and fitted accurately); these pieces are easily made into cutters of any size or shape required, and if one gets broken it is easily replaced.

Watch jobbers do not seem to like the mandrel, but the more they use it the better will their work be done, and it will certainly save their time to do so. If the fusee requires new holes and the centre wheel holes are right or have been renewed, the teeth of the great wheel will often be found worn and sometimes bent from the wheel having been softened in gilding—the teeth being much longer than is necessary and the spaces cut square at the bottom—and in the case of the teeth being worn from the centre pinion being a wrong size and the depth too shallow. A new wheel would, of course, be the proper remedy for this; but if this may not be done, the teeth should be hammered carefully; the depth tried in the depthing-tool, and when the stopping in the pillar plate or bar is pushed out, the depth marked across the hole. The hole should then be *drawn* until the mark is in the centre of it and a new stopping put in. The great wheel depth should always be as deep as possible; it is a mistake to make it shallow, because it will then run more smoothly. But, supposing the lower fusee hole does not require any alteration, and a new top hole only is required (a repair often wanted), if the old stopping in the plate is removed or—in the case of a $\frac{3}{4}$-plate watch—the fusee piece is broached large enough for a stopping, if a piece of brass is broached to nearly the size of the pivot and then turned to fit the hole in the plate or fusee piece and riveted; if the hole is again broached to fit the pivot and the fusee put into its place in the frame, the chances are twenty to one against its being upright; whereas if the method I have described, of pegging the lower hole and turning out the upper one, be adopted, the upright of the fusee will be secured without further trouble; and, if it is not perfectly upright, the stop-work is most likely to be wrong, and the acdetantant will require bending to get it to act in the steel wheel, which, of course, is botching.

If the barrel holes are worn, and the barrel is, as it often is, out of truth, it may be better to put in a new stopping in the barrel and get it true by the cover; but generally it will be sufficient to close the holes by laying the barrel on a small round stake and hammering up the boss from the inside of the barrel. This boss is usually left large, and if it is hammered on the outside edge the hole will be closed, when it can be made to fit the pivot by broaching with a round broach, and it will be good enough to last for years; this repair is often an improvement, as it lessens the rubbing surfaces of the shoulders of the barrel arbor pivots. If the hole in the barrel cover is too large and the cover too small, from the expansion of the barrel from the breaking of strong mainsprings, the best remedy is a new cover, which anyone can make without any telling; but in the case of a new cover being made, the barrel is not likely to be true, and the cover should be snapped into the barrel before it is brought to the right thickness; if, when the endshake of the arbor is adjusted, the arbor and barrel are put into the callipers, it will be seen if the barrel is true—if not, the cover should be marked on the high side, taken off and turned until it fits easily, and then hammered carefully on the outer edge of the side that is marked until it fits the groove in the barrel; and this, if done the required amount, will bring the barrel true. When a barrel cover is hammered on one side until it is out of round, the barrel and cover should be marked in order that the cover may always occupy the same position in the barrel. Should the old cover fit the barrel and the hole only be too wide, the truth of the barrel can be ascertained in the cullipers, and the cover marked as before. When hammering the boss to make the hole smaller, it can be hammered a little more on the marked or high side, which will bring that side down and get the barrel true; but, as so many barrel covers fit loosely, hammering the edge of the cover on the high side answers the double purpose of getting the barrel true and making the cover fit tight enough. If these repairs are carefully done there need not be any marks of the hammer left on either the outside of the barrel or cover.

(To be continued.)

Ancient Timekeepers.

By J. W. Parr.

THE happy possessor of a modern chronometer is doubtless, in many cases, unaware of the advantages he enjoys from existing in an age when mechanism has practically become perfected.

It would be difficult to ascertain how long a time elapsed from the period when the "evening and morning made the first day" until man's ingenuity devised a means of calculating the passage of those valuable moments of which his duration is composed. The sun-dial of Ahaz has been often referred to as the earliest example of a contrivance for recording time; but, as the Chaldæans were accustomed to calculate eclipses and other astronomical phenomena at a much earlier period, it is probable they were in possession of some instrument of a chronological character. The first mechanical contrivance in any way approaching to our modern notions of a timepiece, however, was the Clepsydra, or water clock, supposed to have been invented by Ctesbibius of Alexandria and introduced at Rome by Cornelius Scipio Nascia many years before the birth of Christ. This simple timekeeper was so constructed that the water issued, drop by drop, through a hole in the vessel and fell into another in which a light floating body marked the height of the water as it rose and, by this means, the time that had elapsed. These crude instruments, we are told, "were set full of water in the courts of judicature, and by them the lawyers pleaded in order to prevent babbling, and cause those who spoke to be brief in their speeches." Hour or sand-glasses are also supposed to have originated in Alexandria, and to have been introduced into domestic use amongst the Romans about a century-and-a-half before the Christian era. The exact period when clocks with wheels were invented, however, appears shrouded in mystery; there are no two writers to be found on the subject who are agreed. By some the invention is ascribed to as early as the ninth century, and though it is alleged that clocks without water were set up in churches and elsewhere towards the end of the twelfth century, the author of the *Divina Comedia* is the first writer on record who applies the term horologium to a clock that struck the hours; and he was born 1265, and died 1321. In 1288, during the reign of the first Edward, a fine, levied on a lord chief justice, was applied to the purpose of furnishing the clock-house near Westminster Hall with an horologe, which, it is further stated, was the work of an English artist. Mention is also made of the setting up of a clock in Canterbury Cathedral about the same period, and in that of Wells in 1325. It would appear from this that the three Dutch horologiers, from Delft, who came over at the invitation of Edward III. in 1368, were not, as is often stated, the introducers of the art, though they, very possibly, helped us to improve it.

The ancient German city of Nuremberg has always laid claim to the invention of pocket clocks, as watches were first named; and the fact that they were in early times called Nuremberg eggs, from their oval shape, seems to favour this claim, which dates back to the year 1477. There is no doubt, at least, that one Peter Hele, a clever mechanician of that city, who died in 1540, made small watches of steel so early as 1490 which moved without weights, pointed out and struck the hours, and might be worn on the person. Watches, however, were not very generally used in England until the end of Elizabeth's reign. Shakespeare frequently mentions the clock, and in the *Twelfth Night* he makes Malvolio exclaim, "While I perchance wind up my watch, or play with some rich jewel;" an expression that would lead us to suppose that they were even then regarded rather as toys or ornaments than things of necessary use.

Archbishop Parker, in 1575, left by will to the Bishop of Ely his staff of Indian cane with a watch in the top of it. Several other walking-stick watches are still preserved in collections of bijouterie, while watches in rings are even yet more common. One of the Electors of Saxony used to have a watch in his saddle. The Earl of Leicester gave to Queen Elizabeth, as a new year's gift, "One armlet or shakell of golde, all over fairly garnished with rubyes, and dyamondes, having in the closing a clock." Yet the excellence of some of these ancient timekeepers is remarkable, for Dereham, in his *Artificial Clockmaker*, mentions a watch of Henry VIII. which was in order in 1714, and of which Sir Isaac Newton had often been heard to speak.

Guy Fawkes carried a watch in a more practical spirit than Malvolio or Archbishop Parker. Stowe tells us that one was found upon him which he and Percy had obtained the day before "to try conclusions for the long and short burning of the touchwood with which he had prepared to give fire to the train of powder"—a proof that even in the third year of James I. watches were not commonly worn, or the circumstance would not have been mentioned.

In the next reign, however, we find the London "Clock Makers' Company" incorporated 1631, which may be taken as a sign of the increased use of these articles and the growing importation of their manufacture.

Early watchmakers appear to have largely adopted the forms of fruits and flowers. In the famous Bernal collection there was a Nuremberg watch in the shape of a pear. Another, shaped like a melon, was made by a Frenchman: it is only one inch-and-a-quarter in diameter, and has a key in the form of a melon leaf. At the South Kensington Museum is a very small apple-shaped watch. One of the old watches of Nuremberg has the form of an acorn and is provided with a small wheel-lock pistol, which is supposed to have been used as an alarum. Another watch, talked about by the archæologists, is in the shape of a tulip with three crystal faces. One, having the same form but scarcely an inch in diameter, is so constructed that the leaves or petals of the flower open at the bottom of the watch, disclosing a small spring which pushes up the lid and shows the dial face.

Another watch in the Bernal collection had its works contained within the body of a tiny eagle. The bird opened across the centre and displayed a richly-engraved dial-plate, while the exterior was rendered classical by the story of Jupiter and Ganymede; it might either be suspended from the girdle by a ring, or be rested on a table by means of three claws. Even ducks have occasionally had a share of watchmakers' attention bestowed on them, a duck-shaped watch, about two inches-and-a-half long, being now in the South Kensington Museum. In the Dover Museum was a double-cased egg-watch with two moveable dials, one for showing the hours of the day in the usual fashion and the other for the names and days of the month. There are also means for denoting the day of the week and the position of the sun in the Zodiac; but, strange to say, the hands go the reverse way from those in ordinary watches, as though the artist's notion of time took a backward direction.

Some dismal specimens of curious workmanship are to be met with in those shaped in the form of a skull or death's head, intended no doubt as mementos of the brevity of existence. One of this doleful family, made in the seventeenth century, opens at the lower jaw to show the hour. But the most celebrated death's-head watch belonged to Mary Queen of Scots, and was given by that royal lady to Mary Seton, her maid of honour, and came afterwards into the possession of Sir Thomas Dick Lauder. It is of silver gilt. The forehead of the skull bears the symbols of death—the scythe and the hour glass—placed between a palace and a cottage, to show the impartiality of the grim destroyer. At the back of the skull is Time destroying all things, and at the top of the head are scenes describing the Garden of Eden and the Crucifixion. The watch is opened by reversing the skull, placing the upper part of it in the hollow of the hand, and lifting the jaw by a hinge: this part being enriched by engraved representations of the Holy Family, angels, and shepherds with their flocks. The works of the watch form the brains of the skull, and are within a silver envelope, which acts as a musically-toned bell, while the dial-plate serves as the palate.

All kinds of ingenuity were exercised in selecting the materials, forms and arrangements of watches. There is at present a watch, not larger than an egg, in the Academy of Sciences at St. Petersburg, said to have been constructed by a Russian peasant in the time of the Empress Catherine II. This elaborate work is both a repeating watch and a watch that performs a chant. Inside is a representation of the tomb of Christ with Roman sentinels on guard. On pressing a spring the stone rolls away from the tomb, the sentinels fall down, angels appear, holy women enter the sepulchre and sing the same chant which is sung in the Russo-Greek Church to this day on Easter Eve.

The reign of Charles II. was remarkable for the improvements made in watches. Spring pocket watches were invented by Hooke in 1658, and repeaters were introduced, one of the first of which Charles sent as a present to Louis XIV. of France. According to some authorities, however, notably the *Memoirs of Literature*, some of the most ancient watches were strikers.

One recorded watch is remarkable for its size, and was made for an Irish giant about a hundred years ago. The works were very strong, and the watch, with the seal and key, weighed nearly a pound. Far more numerous, however, have been the tiny watches, marvellous on account of the quantity of mechanism compressed within small spaces. One of these is about the size and shape of an almond. At the first great Exhibition the Swiss exhibited a watch only three-sixteenths of an inch in diameter, inserted in the top of a pencil-case. It showed hours, minutes, seconds and the days of the month. Arnold, a notable maker, presented to George III. an exquisite watch, of the size of a silver penny, set in a ring. It consisted of a hundred-and-twenty separate parts, the whole of which weighed together less than six pennyweights; and so intricate was the work that Arnold had to make tools himself before he could make the watch. When the Czar of Russia heard of this, he offered Arnold a thousand guineas to make a similar one for him: but this the artist refused, determined that his own Sovereign's watch should be unique.

It is scarcely to be wondered at that these compact little pieces of mechanism should sometimes have been regarded, soon after their introduction, as the abodes of spirits of good or evil. The following quaint tale is related by Aubrey of an alleged sorcerer in the time of James I.: "One time, being at Home Lacy, in Herefordshire, he happened to leave his watch in the chamber window. The maidens came in to make the bed, and hearing a thing in a case cry 'Tick, tick, tick,' presently concluded that that was his devill, or familiar, and took it by the string with the tongs and threw it out of the windowe into the moat to drowne the devill. It so happened that the string hung on the sprig of an elder that grew out of the moat, and this confirmed them that it was the devill, and so," adds the writer, "the good old gentleman got his watch again."

Substance of Modern Cameos.—The substance of which a modern cameo is made is a piece of sea-shell. Every one must have noticed that, while the outside of many shells is rough and unseemly, the interior is perfectly polished, and often of a brilliant colour. If the shell be broken, the way in which the two layers lie upon and pass into each other may be clearly seen. Shells are chosen on account of the thickness and hardness of the layers, of the contrast of colour between them, and the presence of knobs on the exterior surface, which render it possible to work in relief.

Birmingham News.

From Our Correspondent.

A MORE hopeful tone seems to be finding its way among manufacturers, but, as far as I can learn, there is no great reason for it. Still, there is a decidedly cheerful spirit manifested, and there are some people who prophecy a change for the better. I fear, however, that the end of the depression is not yet; still, it is encouraging to find amongst one's friends those who are sanguine about an early improvement. Bad trade has so long confronted our most persevering efforts, that we have been taught to look warily upon any promise of a speedy return to the old days of prosperity; in the meantime, hard-earned surpluses are rapidly diminishing, expenses are being most stringently curtailed, and even those houses which retain anything of their former prosperity, now wisely exercise self-denial. It speaks well for the morality of our traders when they are found to be cheerfully sacrificing home luxuries, instead of attempting, at the expense of creditors, an ostentatious display. This is the case in many instances we know, and the knowledge of it helps our workpeople the better to bear their burden.

* * *

Fine Gold work is asked for pretty freely, and I learn that there has been a few good lines taken. Makers expect the demand to increase.

* * *

I was rather amused the other day to hear a factor express his gratitude for the jobbing trade; it is the sheet-anchor to-day of many who, a few years ago, rather despised it, or, at any rate, regarded it as a hindrance to the more lucrative portions of their business. Even now it is scarcely valued enough. I have seen in different parts of the kingdom, especially in Ireland, valuable articles of jewellery completely spoiled by having been placed in the hands of unskilful workmen who possess but one qualification—that of being willing. Now, if shopkeepers, who make decent profits out of this branch of the trade, would assist us, by securing more of these sick and maimed articles, our great hospital is prepared to considerably extend their existence as well as to restore them to their original beauty.

* * *

S. Blanckensee & Son, of Frederick Street, one of our most energetic and prosperous houses, well known throughout the kingdom for the excellence of their work, and whose productions are equalled by few, have, I am pleased to say, successfully competed for a piece of work, in the form of a key, to be used at the opening of a public park at Leicester. I learn, from good authority, that the eminent firm of T. & J. Bragg, of Mayoral chain fame, tendered for this; and have to congratulate Messrs. Blanckensee upon their success in the face of such powerful competitors.

* * *

I observe with pleasure that my mention of the prices charged for assays has attracted the attention of interested persons in London and other places, who pay considerably higher prices for their trials, &c. I hope attention to this item will become general, and that there will be a reduction all round.

* * *

Silver and electro-plate trades are very quiet, and makers who have large stocks on hand are anxiously waiting for a move in the market. Through the courtesy of Mr. Derry, I had an opportunity of viewing a really fine stock of these goods, all of finest and highest quality, and was particularly pleased with a very beautiful Crown Derby tea service with silver mountings, &c.

* * *

Nickel Trade.—Representatives, in this line, of leading houses, report much better prospects.

The Hoarded Wealth of India.

NEVER during its existence has India been so rich in jewellery as now. The people are always adding to their stock. Savings from nearly all sources are disposed of in this way, and these savings are being constantly made—often at the expense of clothing, sometimes at the expense of greater necessaries of life. The making and the storing away of wealth in this form is the national peculiarity of this country. It is indulged in by all classes of natives. Jewellery is regarded as the most stable kind of wealth, and fortunes are never counted without estimating the value of the stock of jewellery. It can always be pledged or disposed of. The market for its sale is never closed and never depressed. The most ignorant native who wishes to sell a piece of jewellery knows its market value quite well: he can scarcely be cheated. Jewellery forms the greatest factor in matrimony. The most lowly bride has her *stridhan*, which is often equal in value to five years' income of the bridegroom. There is often a scarcity of clothing; sometimes a scarcity of cooking-pots; generally not a particle of furniture; but nearly always a stock of jewellery. The wife that has no jewellery possesses nothing else; she cannot be robbed. The family that does not possess jewellery is absolutely indigent. One of the greatest boasts of the jewellery-owner is that his hoards cannot be taxed. A man may own jewellery valued at a lac of rupees, and pay no income tax. This is a source of great satisfaction. Jewellery yields no recurring income, but it is prized more than Government paper. "If it never increases it never diminishes," is a national saying, common amongst men and women alike. No native marriage, except amongst the most impoverished, takes place without a transfer of jewellery, and very frequently of new jewellery. So great in value is the new jewellery that is introduced into families by marriage, that we dare not estimate it; the amount would be so fabulous. Truly the investment of wealth in jewellery in India is the greatest and most remarkable institution in the country. Every other investment sinks into insignificance beside it. Under no native prince or rajah of former times has jewellery accumulated as it has accumulated under the British Government in British India. For a century past the sacking of towns has been unknown; the plunder of individuals has been greatly restrained; and wealth in the form of jewellery has accumulated. Now, if men set store by their wealth in jewellery, and if one man estimates another by his wealth in jewels, is it not manifest that as this kind of wealth increases, and is found to be secure to the possessor, the people who gauge themselves as others gauge them—by the jewel wealth—must be contented, as far as the possession and security of this kind of wealth can content them? We can scarcely imagine the possessor of considerable wealth in jewellery being discontented. There must be political contentment amongst the class of jewellery-owners; and one-half of the people of India are jewellery-owners. It is only when the day of taking stock of the family jewellery comes round, such as the occasion of a wedding or a great gala day, that a stranger can form the slightest conception of the amount of wealth in the family in the form of jewellery. Amazement at once strikes him as he is for the first time permitted to see the amount of accumulated wealth. The inventory day is, *par excellence*, the women's day. Gathered round the iron safes, the cash-boxes, the metallic boxes, the neatly-carved wooden boxes, the delight of the women is observed in their eyes as each pair of golden bracelets, studded with pearls; each pair of diamond, or emerald, or sapphire earrings; each nose-ring with large pearls, massive gold chains, and a large number of rings, expensively and even extravagantly gemmed, are handed round the family circle for admiration—and great is the family delight. The towns of India must be peaceful towns, and the laws of India must be good laws, where jewellery wealth, amounting in value to crores and crores, can be held secure by the meanest of the subjects of the great Empress Victoria. The Government that has permitted this great jewellery wealth to grow into monster porportions, and that has never coveted a single grain of the hoarded gold, as is proved by the history of the wealth itself, is entitled to respectful regard. We cannot in honesty or justice refuse to approve of a Government that has followed out this policy of upholding and maintaining the rights of the people to their jewelled possessions for more than a century. When we single out this item of India's wealth, we do so for a useful purpose, in the interests of the people themselves, and not in the interests of Government or of income-tax law-makers. In continuing to hoard and keep unremunerative such vast treasures as are now held in India, the people are unnecessarily impoverishing themselves. The system has had the fullest scope, and has been availed of by the people to the fullest extent, showing their abounding confidence in the national idiosyncrasy. It is now much overdone, and should be moderated. When wealth is hoarded in a country in millions, and lies unproductive, it attracts the covetous, and is a source of national weakness. It should be profitably employed in the creation and support of industries that may advance the progress of the country. One main cause of the poverty of India is the want of varied employment for its people. As in Ireland—a country whose economic poverty is not dissimilar from that seen around us—two-thirds of the population are agricultural. The burden placed on the soil is much greater than it can bear. There is no prospect of relief from the congestion in India by means of emigration, such as Lord Salisbury is sanguine will bring prosperity and peace to Ireland. The people, whether for good or ill, are inalienably rooted to the soil, and there is also for them a much narrower field for selection. The only hope for the regeneration of the country is the gradual opening up of industrial enterprises. The vast population of India consumes everything produced in the world; it manufactures nothing. The men who wrap their talents in a napkin, and bury them in the ground, should look to it; they are not merely fatuously relinquishing much "unearned increment," but they are deliberately retarding the progress of the country. Nowhere under the sun should the thousand arts of peace prosper to greater advantage than in India; nowhere are precious opportunities so wantonly neglected.—*Advocate of India.*

APPLICATIONS FOR LETTERS PATENT.

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, and 6, Lord Street, Liverpool.

10,699. George William Pridmore and S. Hands, Birmingham, for "A watch protector." Dated 21st August, 1886.

10,719. Zélie Zeniàde Barber, London, for "A fastening for chains, necklets, bracelets and the like." Dated 21st August, 1886.

10,738. Francis Robert Baker, Birmingham, for "A new or improved fastener for cuffs, wristbands, collars, waistbands and other articles of dress, buckles, jewellery and the like." Dated 23rd August, 1886.

11,194. Henry Davey, London, for "An electrical motor escapement for clocks." (Complete specification.) Dated 19th July, 1886. (Previously included in No. 9,365, 1886.)

11,390. Germain Bapst and Lucien Falize the younger, London, for "An improved sonorous alarm, and its application to watches, clocks and alarums." Dated 7th September, 1886.

11,457. John Eshelby, Dublin, for "Improvements in repeating or digital recording work in watches or clocks." Dated 9th September, 1886.

11,468. William Henry Munns, a communication from Joshua Heilmann, France, for "A clasp for fastening shoes, gloves, belts, bracelets and similar articles." Dated 9th September, 1886.

11,713. Rebecca Joseph, London, for "Watches being attached to the inside or outside of a muff, bag, lady's companion or anything appertaining thereto." Dated 15th September, 1886.

11,747. William Ernest Patterson, Birmingham, for "Improvements in solitaires, sleeve and cuff links, dress studs and other like fastenings for articles of dress and jewellery." Dated 16th September, 1886.

11,748. Alfred Martin, Birmingham, for "A new or improved fastener for gloves, cuff and sleeve links, brooches, solitaires, napkin holders, purse holders, waistbands and other articles of dress and jewellery." Dated 16th September, 1886.

11,749. George Frederick Spittle, Birmingham, for "Improvements in solitaires, sleeve and cuff links, shirt studs and other similar fastenings for articles of dress and jewellery." Dated 16th September, 1886.

11,750. Alfred Martin, Birmingham, for "Improvements in fastenings for brooches and other similar dress fastenings and ornaments." Dated 16th September, 1886.

11,811. Frederick Arthur Walton, London, for "Improvements in solitaires, studs and other like fastenings for articles of dress." Dated 18th September, 1886.

Correspondence.

All Letters for Publication to be addressed to the EDITOR *of* THE WATCHMAKER, JEWELLER AND SILVERSMITH, *Imperial Buildings, Ludgate Circus, E.C.*

All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.

To THE EDITOR OF *The Watchmaker, Jeweller and Silversmith.*

SIR,—The discussion on the Hall-marking of foreign cases and the present depression in trade has not as yet had much practical effect. We all know and recognise the evils under which we suffer, but how far the present depressed state of trade is due to them, and how much of it is owing to want of enterprise and progress among ourselves, are points apparently not easy to determine. Neither do we seem able, in the matter of our wrongs, to formulate a simple scheme to which the whole of the trade can assent with a united voice, and which may be presented to Parliament with some prospect of success. Since your last issue a meeting has been held in Clerkenwell, at the instance of the case-makers, which seems to have been largely attended, and—judging by the newspaper reports—pretty unanimous. Several Members of Parliament took part in the proceedings, and, altogether, it is evident that the meeting was an important one; yet it appears that the principal resolution adopted is not calculated to carry the matter one step forward, but rather the reverse. The resolution, which, we are told, was carried unanimously, entreats our representatives in Parliament (the Members then present) "to take active and immediate steps to press upon the Government the importance of bringing in a Bill to preserve the English Hall-mark for English watch-cases and movements only." This resolution reads like an extract from the old records of the Clockmakers' Company more than anything else, and that it should have been put forward as the deliberate opinion of the trade at this time of day seems little less than astonishing. The proposition would be a good one if it were practicable, and one which the trade generally and responsible statesmen could adopt; but, unfortunately, it is neither one nor the other. It is, in fact, protection pure and simple. Such an enactment applied to completed movements only (which it is probable the framers of the resolution meant) would be useless. It must embrace movements in all stages of manufacture and the materials of which they are composed, otherwise it would admit of completed movements being sent over in parts and put together here. Its first effect would be to shut out movements for complicated watches—still a feature in London manufacture—as well as to raise the cost of many materials used in ordinary work, and in this way to still further handicap us in the market. It is difficult to believe that the trade generally will assent to such a proposal as this, and it is quite certain that it will not pass the House of Commons till the fiscal system of the country is again protective—an event too remote for serious consideration. An argument often heard in support of such measures is the protection of the public; but I have never yet heard its advocates descend to particulars and state exactly how it is going to be done. Instead of indulging in such visionary schemes, would it not be better to enforce the law as it stands? It is clear, and strong if put in motion, to meet all cases of fraudulent trading. The best form of protection, both for the trade and the public, would be a closer contact between the manufacturer and the wearer; but, failing this, let a Watchmakers' Protection Society be formed to educate the public mind, and to take up such cases of fraud as those mentioned by "Traveller" in your last number. The conviction of a few of these dishonest dealers would have a most salutary effect. Let the trade also unite on the simple issue of the Hall-marking of foreign cases—on which we seem pretty well agreed—and press it on with vigour and determination. To indulge in schemes that invite opposition and lead to certain discomfiture, is absolute folly. But when all is done—even to the preserving of the English Hall-mark for English watch-cases and movements only, if that were possible—the competition under which we suffer would still remain, and must be met by other means. I am, &c.,

"OBSERVER."

To THE EDITOR OF *The Watchmaker, Jeweller and Silversmith.*

DEAR MR. EDITOR,—I notice in your September issue a small paragraph taking notice of a suggestion by a correspondent of the *Electrical Review.* I do hope none of your readers will be tempted to cut "small grooves in the fronts, or bezels, of their watches," however "common" their watches may be. Conceive, Mr. Editor, a man, sleepy and cross, as men are apt to be when the alarum goes off; conceive, I say, such an one proceeding to extract the "insulated wire made bare at the end" from the "small groove in the front, or bezel." That watch and that man would be objects for pity, would they not? The man who made the suggestion in the *Electrical Review* had probably seen the very elegant arrangement of a watch, battery and bell, serving as an alarum, exploited in this country, I think, by Messrs. Baume, of Hatton Garden.

I am, your obedient servant,

2nd September, 1886. J. STEPHEN.

MR. G. F. KUNZ, of the firm of Tiffany & Co, New York, writes:—I notice on page 15, July number, you say—"A geologist who can discover the real matrix of the ruby and sapphire, will no longer need to write pamphlets or read lectures in order to gain an income, but will soon be heard of in financial circles as the 'Jewel King.'" Permit me to say that Col. C. W. Jencks, of Boston, found, over ten years ago, while carrying on systematic mining for corundum at Jenck's corundum mine, Franklin, Macon Co., North Carolina, not only sapphires and rubies, but also the finest Oriental emerald (corundum) ever found. This specimen is in the collection of Mr. Clarence S. Bement, of Philadelphia. The gems were very few and far between, so that, although he found the matrix, the mine has only been a success as an emery or corundum mine, and not as a gem mine.

"PERPLEXED" writes:—Could any of your readers inform me, through your paper, the reason, in using a Bunsen or Smee battery, that the zincs, after being strongly amalgamated with mercury, after being in the sulphuric diluted acid about twenty minutes, the acid begins to friz, as though the zincs were not amalgamated. I have thickly amalgamated them, but with the usual disappointment. If any of your readers could show, through your columns, my error, you would greatly oblige.

Buyers' Guide.

The Sheffield Smelting Company, Sheffield, *Sell* Gold and Silver (pure and alloyed). *Buy* all materials containing Gold and Silver.

F. W. Powell, Jeweller and Silversmith (Manufacturing), 23, Great Sutton Street, Clerkenwell, E.C. Wholesale only for Gold and Silver Jewellery; Silver Cigar, Cigarette and Card Cases, Match Boxes, Salt Cellars; Silver and Glass Smelling Bottles; Sovereign Purses.

WANTED by a GENTLEMAN (Tool and Material Dealer) with connection among Birmingham Jewellers, an Agency for Precious Stones or Valuables for Mounting. Having a long business acquaintance with Birmingham manufacturers, can open a good trade for importers or makers of good, useful articles. First-class references. Address—A. OSBORNE, 89*a*, Spencer Street, Birmingham.—[ADVT.]

The Watchmaker, Jeweller & Silversmith.

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The Watchmaker, Jeweller and Silversmith.

A Monthly Journal devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

Subscription.—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

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Address all business communications to

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Imperial Buildings, Ludgate Circus, London, E.C.

Cheques and Postal Orders to be crossed and made payable to J. Truslove.

Agent for the Australian Colonies:
EVAN JONES,
Hunter Street and Royal Arcade, Sydney, N.S.W.

Editorial.

THE immediate outcome of the meeting on the Hall-marking of Foreign Watch Cases, which we reported last month, and of the suggestion of Captain Penton, M.P., has been the formation of a London Watchmakers' Trade Protection Association, a report of the first meeting of which will be found in another column.

The fact of this society having been successfully organised so soon after the present agitation may be said to have definitively commenced, is a clear proof, if any were wanting, of the magnitude of the grievance of which English watchmakers are complaining, and the keenness with which it is felt; it is also a satisfactory indication that the trade recognises the necessity for continuous action in the matter.

We are glad to see further signs of a desire for organisation, as indicated by the meeting of the Coventry case makers (also reported on another page), and should be pleased to think the said meeting will result in the formation of a similar association for that centre.

But, while recognising their general usefulness to the trade, it will be well to point out that such associations can do very little towards attaining the end in view, and for which the first meeting was convened, viz., protection from unfair foreign competition, without the combined assistance and co-operation of all branches of the trades concerned. For one section of the trade to set themselves up as the mouthpiece of the remainder would only be to court inevitable and deserved failure in any action it may undertake.

The late Sir Henry Jackson's measure was wrecked through its one objectionable feature, and the consequent opposition of a large and influential body of manufacturers; and the movers in the present agitation would do well to bear this in mind. The Hall-marking question is an extremely difficult one to deal with, as is very ably pointed out in our correspondent "Observer's" letter in our last month's issue, and it can only be satisfactorily settled by the united action of the whole trade.

We would suggest that, before any further parliamentary action is taken by the leaders of the present movement, every watchmaking centre should form a trade association, from each of which, together with the other representative bodies, a delegate could be chosen to act on a central committee which should represent the whole trade.

In the meantime such associations as already exist would do useful work in getting together statistics, &c., and generally furthering the work in hand.

General Notes.

We have received a letter from Messrs. T. & J. Bragg, of Vittoria Street, Birmingham, in which they say the statement of our Birmingham correspondent, published in our October issue, with reference to their having tendered unsuccessfully for a key to be used at the opening of a public park at Leicester, is incorrect.

The International Geodetic Congress was to assemble in Berlin on 30th October. The adoption by all nations of Greenwich as the first meridian, in accordance with the decision arrived at at the Washington meeting, is to be strictly enforced. It will be proposed to establish a Central Geodetic Office in Berlin.

A novel application of jewellery to useful as well as decorative purposes has been devised by Mr. Powell, of 23, Great Sutton Street, Clerkenwell, E.C., in the shape of a new ball programme holder, which from its obvious utility and advantages should become popular with the devotees of the fair goddess at this season and enjoy a large sale. It is in the form of a brooch, which can be pinned to the dress in any convenient position, pendant from which by a small chain is a clip to hold the programme, while from the middle of the brooch depends a miniature rubber stamp contained in a small case, which can readily be used to mark a partner's programme. The whole forms a very handy and ornamental adjunct to a lady's evening equipment.

The key mentioned by our correspondent in his last month's Birmingham News, manufactured by Messrs. Blanckensee & Son, which was presented to the Mayoress of Leicester, Mrs. Hart, is made in 18 carat gold, richly wrought. In the centre of the head, richly worked up with rubies, emeralds, pearls and diamonds, is the coat of arms of Leicester; the outer border is treated in elegant scrolls, relieved with fine Oriental pearls; on the back of this head is engraved a suitable inscription setting forth the object of the presentation; the head of the key is made detachable, so that it can be worn at any time as a pendant or neck ornament; the shaft or stem of the key is of fine silver, relieved by beautifully gilt ornamentations, whilst the wards of the key are shaped to represent the letters S. H. P., standing for Spinny Hill Park. The article, by the above mentioned ingenious arrangement, is a useful as well as ornamental jewel, and is fitted in a rich velvet case, the whole forming a very fine specimen of art work.

A new Thermometer.—A French thermometer has been devised of such sensitiveness, that it will even denote, by a deflection of the index needle of nearly two inches, the entrance of a person into the room where it is placed, and by putting the hand near the bulb, the needle is deflected the whole extent of the graduated arc. The apparatus consists of a bent tube, carrying at one end a bulb which is coated externally with lampblack. The tube is filled to a certain extent with mercury, and is supported by arms pivoting on a steel knife-blade. Just above the pivot is fixed an index needle which moves across a graduated arc; and beneath the pivot hangs a rod, to which is attached by friction a small weight that serves to balance the needle so as to cause it to point to zero on the arc. When the temperature rises, be it ever so slightly, the heat being absorbed by the lampblack dilates the air in the bulb, and drives the mercury forward. The centre of gravity of the apparatus being displaced, the needle will immediately turn towards the right—and when, on the contrary, the temperature decreases, the needle will point towards the left.

Free Coinage of Silver.—A general meeting of the council of the Workmen's Association for the Free Coinage of Gold and Silver was held last month at the conference rooms of the association, Aldgate, E.C., "to consider the position of the movement for the free coinage of silver at a fixed ratio to gold, with a view to the alleviation of the existing industrial depression." Captain T. S. Lemon (president of the British Seamen's Society) took the chair, and there was a numerous attendance. The chairman stated that the Royal Commission on Currency would meet early in November, when evidence from those interested in the gold and silver coinage question would be taken, and the views of the working classes should be made known. The depreciation in the value of the Indian rupee affected tens of thousands of shipping men trading between the ports of the United Kingdom and the Eastern part of the world. If a man sent from India, say, 50 rupees, valued there at £5, to his relatives in England, the latter would not receive more than £3 10s. or £3 15s. They wanted the restoration of the free coinage of silver, so that there should be a greater purchasing power among all classes of workmen, and that continual reduction of wages should be stayed. The secretary then read a draft manifesto to the industrial classes on this question. After discussion, on the motion of Mr. W. Watson (East London Shipping Trades), seconded by Mr. W. Stay (Liverpool Shipping Exchange), the manifesto was adopted, and ordered to be circulated among the industrial organisations of the country. Delegates were appointed to tender, on behalf of the shipping interests, evidence before the Royal Commission on Currency. Letters were read from, amongst others, Mr. Samuel Smith, M.P., Mr. Frank Hardcastle, M.P., Mr. Thomas Sutherland, M.P., Mr. Edward Sassoon, and Colonel Tomline, approving the movement, and then, with a vote of thanks to the chairman, the meeting was closed.

A few years ago the trustees of the British Museum gave permission to Messrs. Goupil & Co., of Paris, to photograph the rich collection of Hans Holbein's drawings preserved in our national institution. These will shortly appear in the form of a folio volume, containing a selection of that master's best works, executed in pen and water-colours. Worthy of attention are general designs for cups, clocks and jewellery designed chiefly for Henry VIII., showing the versatility of Holbein's powers as well as the unusual thoroughness of his execution as an artist. A fine ornamental composition with the pen and washed with Indian ink is the design for a clock for Sir Anthony Denny, presented by him as a New Year's Day present to the King in 1544. This fact, however, is recorded on the drawing itself, which at one time belonged to Mariette, the celebrated French collector, and to Horace Walpole. Another design represents a chased and jewelled cup, having on it the initials of Henry VIII. and Jane Seymour, and the motto "Bound to obey and serve." A superb design for the hilt and sheath of a dagger, in Indian ink, formerly in the Hugh Howard collection, and purchased for the British Musuem in 1874. Finally, a design for a seal of Charles Brandon, Duke of Suffolk, in honour of Richmond. It consists of the Duke's crest within the garter, and on an outer circle is inscribed, "*Carolus Dux Suffycie pro honore suo Richmond.*"

A Contemporary observes that the articles, letters and maps which have appeared in the *Times* have done much towards attracting public attention to Queensland as a gold-producing country. We have not heard the result of the applications for shares in the "Bonnie Dundee Company," which was registered here on 27th September, but we should not be surprised to hear that the whole of the capital—120,000 shares of £1 each—has been fully subscribed. Mr. John McDonald, the owner—or principal owner — is very fortunate in having brought the negotiations for the transfer of the property to a close at the very nick of time. He is to be paid the sum of £100,000, viz., £30,000 in fully-paid shares and £70,000 in cash. It is stipulated that the purchase shall be completed on or before 17th November, 1886, on which day the shares and purchase-money shall be issued and paid, and possession of the premises shall be given, and up to which day all outgoings shall be discharged and all incomings received by Mr. McDonald. The first subscribers are Mr. H. D. Kimber, 79, Lombard Street, E.C., and Mr. A. McIlwraith, shipowner, 5 and 7, Fenchurch Street, E.C., who take 300 shares each; and Mr. R. McIlwraith, merchant, 138, Leadenhall Street, E.C.; Mr. A. P. Matheson, merchant, 9, Glendower Place, S.W.; Mr. B. Gibson, merchant, 87, Fenchurch Street, E.C.; Mr. J. MacFarlan, Wimbledon; and Mr. M. D. McEacharn, merchant, 5 and 7, Fenchurch Street, E.C., who take 500 shares each.

The Colonial and Indian Exhibition has, no doubt, excited fresh popular interest in, among many other things, two South African industries, viz., diamond digging and ostrich farming, and the demand for both feathers and brilliants which has thus been created has probably done not a little to check the downward tendency of prices which the abundant supply of the last few years has fostered. The practical demonstration of the industries of diamond digging, washing the blue, diamond cutting, and so forth, has been one of the most interesting features of a show in which there is so much to interest at every turn. The good fortune which attended the wash-up on the occasion of the Queen's first visit, gave quite a stimulus to the excitement which this exhibit has created. It has, indeed, been suggested that the "dirt" had been "salted," and that the discovery of the "Queen's diamond" was a preconcerted affair. The suggestion, however, is disposed of by the fact that the specimen in question has proved to be of only inferior quality, for, if "salting" had been resorted to at all, it is certain that the opportunity would not have been lost of making certain that a good, and not an inferior, stone should be "discovered."

English Coins at the British Museum.—In a short but interesting article on the collection of English coins at the British Museum, the *Daily News* says:—"It seems that the coinage of the English had no direct connection with the earlier British coinage, nor with the short-lived currency which the Romans introduced into this island. It may be that for some years after their first settlement in this country the Anglo Saxons were without a coinage, their computation in their early laws being never by any smaller denomination than the Roman *solidus*, and in some cases a computation of payments by cattle. The notion of a currency the Saxons probably borrowed from France, when under the rule of her Merovingian kings. The penny was first made during the reign of Offa, King of Mercia, the founder of St. Alban's Abbey, who reigned from 757 to 796. The penny was imitated from the silver *denarii*, introduced by the princes of the Carlovingian House. The pennies of Offa are remarkable for the variety and elaboration of their types, and, considering the age in which they were struck, for their artistic merit. It is supposed that the penny was first introduced from the Continent into Kent, because Kent after A.D. 774 was for a while included in the Mercian kingdom. The first change in the coinage of England, subsequent to Edward III., took place in the reign of Edward IV. Coming to the reign of Henry VII., we find alterations taking place in the silver coinage, which had been untouched for two centuries. The stereotyped character of the English money during this period finds its counterpart in the coinage of the Continent. It was Henry VII., in 1504, who placed for the first time an authentic portrait on English coins; he also made an addition to the gold coins by striking 'sovereigns,' so called because they bore the figure of the sovereign seated on his throne. It was during and after the reign of Charles II. that the English coinage declined very greatly in interest and variety. The first guineas were made in this reign from gold brought from the Guinea coast. In the reign of Queen Anne there were some coins bearing the name of 'Vigo,' because they were made from bullion captured in Vigo Bay."

Ecclesiastical Art Work.—An Exhibition of a remarkable collection of Needlework, and other specimens of art used for the decoration of vestments, or in other ways in the ceremonial of the Roman Catholic Church, has been opened at Brighton in the Royal Pavilion, in aid of one of the local churches. It is probably the finest exhibition of the kind ever got together in the south of England, containing as it does a number of articles of historic interest, and some exquisite specimens of the different branches of art that are laid under contribution to add to the effectiveness of the Romish ritual. The chalices include some that were formerly the property of Pope Boniface VIII. and of Pope Pius IX., whilst there are also shown the latter's alms bag, a *soli Deo* that belonged to him, and the pallium with which he was invested in 1846 on his election to the Papal seat. Among the other curiosities are an ivory and amber rosary once belonging to Catherine of Braganza, wife of Charles II., breviaries and illuminated missals of the fifteenth century, an altar cushion worked by the Empress Eugénie, as well as a cup, giving a fine example of modern repoussé work, purchased by the late Emperor and at his death given to Monsignor Goddard. The needlework includes some wonderful specimens of gorgeous embroidery, both of modern and early date, whilst among the curiosities not strictly belonging to the region of ecclesiastical work are the chains worn by Mr. Rassam when held captive by King Theodore of Abyssinia on his going as the representative of this country to demand the release of the British subjects detained by the King, and which led ultimately to the war of 1868.

The Jubilee Exhibition in Manchester.—The *European Mail* says:—"The Manchester people are not allowing the grass to grow under their feet in regard to the Royal Jubilee Exhibition. The site is at Old Trafford, adjoining the Botanical Gardens, and close to the spot on which the celebrated Art Treasures Exhibition of 1857 stood. The main building is to consist of a central nave, upwards of 1,000 feet in length, with three transepts. A dome 140 feet high is to crown the edifice at the point where the nave is intersected by the central transept. The special object of the Exhibition is to illustrate as far as possible the progress made in the development of the arts and manufactures during the reign of Queen Victoria. The entire control is in the hands of the Executive Committee of thirty members, with Sir Joseph C. Lee as chairman, and chosen by the Council of Guarantors. The guarantee fund now exceeds the princely sum of one hundred and thirty-two thousand pounds, and even that amount is likely to be still substantially increased. All goods are to be delivered before the middle of April, and unpacked before the 25th of that month. There promises to be an exceptionally valuable and interesting collection of pictures produced in the Victorian era, and extraordinary precautions are to be taken for their safety. The grounds of the Exhibition cover 32 acres, and they are to be magnificently illuminated in the evenings by the electric light. The list of vice-presidents is a most influential one, and includes nearly all the nobility of the county palatine, local Members of Parliament, and mayors of neighbouring cities and towns."

The Adelaide Jubilee Exhibition.—A Royal Commission has been appointed by the Queen in Council for the purpose of taking steps for the proper representation of the United Kingdom at the forthcoming Adelaide Jubilee Exhibition. The Duke of Cambridge has been appointed president, and the Commission includes the names of Mr. Stanhope, M.P., Secretary of State for the Colonies; the Duke of Manchester, the Marquis of Normanby, Earls Carnarvon, Dunraven, Granville, and Rosebery; Viscount Cross; Lord Thring; Sirs James Fergusson, John

Gilbert, Henry Holland, Joseph Hooper, Frederick Leighton, John Linton, P. Cunliffe-Owen, Robert Owen, Hon. C. Fremantle, and Colonel Donelly. The business of this Commission will probably be to select some fit person to visit Adelaide in the interests of British exhibitors, to represent them before the international juries, and to arrange for a representative exhibition of the works of British artists. A large portion of the work of obtaining exhibits has already been completed by the London committee of the Adelaide Commission, which has its offices with the Agent-General of South Australia, and a considerable number of British manufacturers have already announced their intention of taking part in the Exhibition.

Mechanical and Trades' Exhibition.—The Mayor of Sheffield on the 19th ult. opened the South Yorkshire Mechanical and General Trades' Exhibition at Glossop Road, Sheffield, the object of which is to stimulate local industries by bringing together in an attractive way the various productions of the district. The Exhibition, it is anticipated, will revive the trade of the Riding.

Institution of Mechanical Engineers.—The members of this institution held an ordinary general meeting in the lecture theatre at the Yorkshire College, Leeds, last month. The gathering took place at the invitation of the authorities of the college, in celebration of the opening of the Engineering Department which has recently been completed. There was a large attendance of members from different parts of the country. Mr. Jeremiah Head (Middlesbrough), president, occupied the chair. Mr. E. H. Carbutt (London) having been nominated as president for next year, the secretary (Mr. Alfred Bache) read a paper prepared by the late Mr. Robert Wyllie (of Hartlepool) on "Triple Expansion Marine Engines." A discussion followed, in which Mr. W. Parker (Lloyd's), Mr. Cochrane, Professor Kennedy (University College, London), Mr. Mudd (West Hartlepool), Mr. Daniel Adamson (Manchester), Professor Smith (Birmingham) and Mr. T. Crampton (London) took part, and was eventually adjourned. Subsequently the president of the college (the Marquis of Ripon) accompanied by Sir James Kitson, Bart., Sir Edward Baines, Sir Andrew Fairbairn, Mr. J. Barran, M.P., and other members of the Council, together with the professional staff, entered the hall, and were received with cheers. Lord Ripon gave the members of the institution a hearty welcome to the college, after which they were conducted through the Engineering Department. In the evening the members dined with the council of the college at the Town Hall, Lord Ripon presiding.

The *Standard*, in an article on the depreciation in the value of silver, says:—"The battle between the Bimetallists and the Monometallists, which has been going on for several years past, shows no signs of drawing early to a conclusion. In the discussion all the civilised nations of the world—as well as many half-civilised races, like those of India and China—are more or less interested, and the elucidation of the truth as to the causes of the depreciation is becoming increasingly desirable every day. Among those who have of late helped to throw light on the question, the able French economist, M. Paul Leroy-Beaulieu, deserves more than a passing notice. According to this authority, the notion prevailing with the Bimetallist School, that the depression in the value of silver arises from the quantity of metal thrown on the market by the demonetisation of silver coinage, is erroneous. No doubt Germany and one or two other States have substituted a gold for their former silver standard, but the liberation of metal, by this change, M. Leroy-Beaulieu contends, is altogether inadequate to explain the great fall that has taken place in the value of silver as compared with gold. The great cause to which the French economist attributes the change, is the enormously increased production of silver within the past twenty-five years. He estimates that the quantity of the metal now produced every year is three times what it was a little more than twenty years ago. M. Leroy-Beaulieu objects to State interference, or any artificial arrangement being attempted, with the view of fixing the relative exchangeable values of the precious metals. He holds that such a remedy would prove worse than the disease. The metals must be left to find their own relative level. Silver has not yet reached its lowest point, but will continue gradually to sink so long as the present enormous production continues, unless there be a correspondingly increased demand for it in the arts.

From our American exchanges we learn that Mr. E. W. Dennison, the head of the important house of the Dennison Manufacturing Co., died on 22nd September, at his country residence, in Marblehead, Mass. Had he lived until 23rd November he would have been sixty-seven years of age. His brother, A. L. Dennison, now living in England, was the inventor of the American system of watchmaking. While in the jewellery business in Boston he established his father in the business of making paper boxes for jewellers. Out of that small beginning grew the Dennison Manufacturing Co., whose box, tag and findings business is now world wide in renown. Mr. E. W. Dennison, who had been a watchmaker and jeweller with rather ill success up to 1847, became a salesman in the paper box establishment then run by his brother. He soon became the proprietor, and his success in business from that time on is well known. As a business man he was very successful; and socially he was one of nature's noblemen, always ready with a warm word of encouragement and open purse for every worthy object. To have personally known Mr. E. W. Dennison was a genuine pleasure. His mantle falls upon a worthy successor in Mr. H. B. Dennison, his son. Mr. Dennison had been in feeble health for about a year. Last spring he had an attack of heart trouble, which with other complications came near causing his death at that time. His funeral was very largely attended, as he was as popular in social circles as he was respected in the marts of trade.

French Trade Marks.—The French are the people for doing things thoroughly. M. Lockroy, Minister of Commerce and Manufactures, has, with the agreement of the other members of the Cabinet, laid upon the table of the Chamber of Deputies a Bill to prevent the importation of foreign articles of manufacture wrongfully marked as French. In virtue of this bill any person marking articles of foreign manufacture with French trade marks, whether by means of stamps, labels or wrappers, or selling such articles knowing them to be counterfeit, will be liable to a penalty of from £40 to £200 sterling, and from three months to three years' imprisonment, or only either of these penalties. In the case of foreign towns, such as Vienna, for instance, bearing the same name as a French town, the mention of the place of origin must be completed by the name of the country in which it is. The punishment may be doubled for a second offence, and the offenders may be deprived for ten years of the right to take part in elections for the Chambers of Commerce. The sentence is to be made public, and inserted in a certain number of journals named by the Bench. This is what some of our watch case makers would like to see here.

The Diamond Market.—From *Amsterdam* we hear there is a moderate demand for cut goods, the prices improving, although coloured goods are not selling; while the *Paris* market is rather lively owing to the great fair of Nishni-Novgorod and the consequent wants of the Russian and Polish buyers. The *London* market has been somewhat quieter owing to the Jewish holidays. The steamers "Drummond Castle," "Mexican" and "Rosslyn Castle" arrived during the month, bringing somewhat higher quotations from the fields, but the consignments being small, they were mostly disposed of. There is a good deal of small stuff on the market. Advices from *Kimberley* state that the market continues firm, all classes of goods being demanded.

Silver.—A still further improvement took place in the market during the last month, the quotations for bars up to our going to press being 45⅜d. per oz., at which price a small amount of business was being done. But a fall in price is to be expected soon, and buyers would do well to hold in for a while.

British Association for the Advancement of Science.

THE "INDUSTRIES" EXHIBITION AT BIRMINGHAM.

(*Second Notice.*)

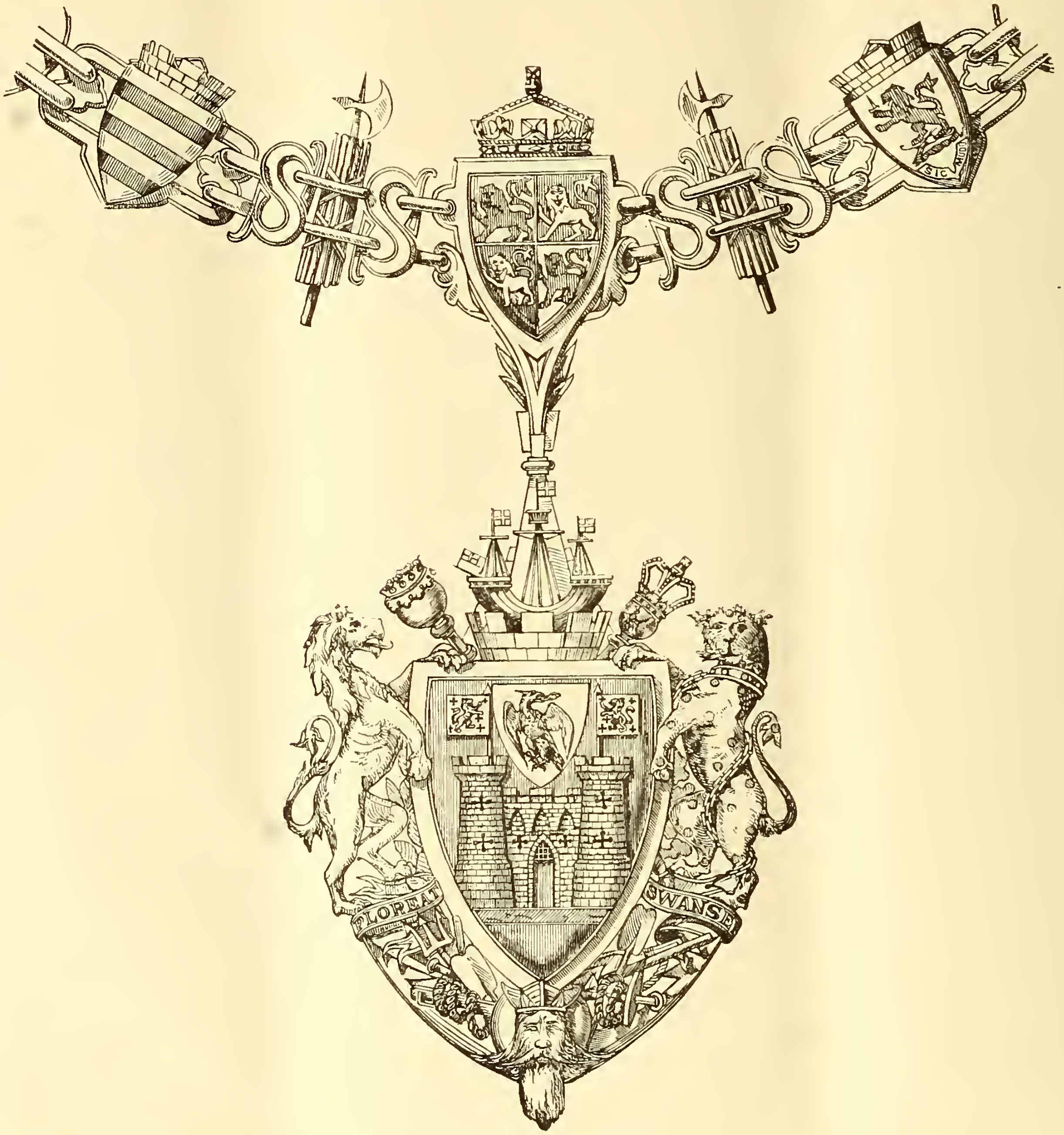
G. H. JOHNSTONE & CO., 38, Northampton Street, occupying the upper portion of the left-hand pedestal of the "Associated Manufacturing Goldsmiths and Jewellers'" case, is the collection of work exhibited by this firm. Its position, unfortunately, renders it very likely to escape notice, as it is placed too high to come within fair visual distance of the majority of visitors, besides which, its plain and solid value appears to disadvantage against the glitter and brilliancy of the mass of gem-set goods with which it is associated. It is, however, well worthy our attention as showing a section of the Jewellery trade not so fully represented elsewhere in the Exhibition, viz., first-class gentlemen's jewellery—studs, links and solitaires, in 15 and 18 carat gold. The top slopes of the stand are divided into six panels (three on either side), the inside ones being used to display a choice selection of shirt studs. Here we see studs of all styles and values, from the "dress set" of brilliants or whole pearls to the plain gold bead or lunette for everyday wear. The pearl bead studs are especially worth notice, on account of their pure lustre and the exact matching of the three beads forming a set. The same remark also applies with equal force to the brilliant sets, the various stones of which are minutely matched as to size, colour and cutting. Following these is a large variety of fancy studs set with diamonds, pearls, rubies, &c., while the ordinary all-gold patterns are also well represented. It is much to be regretted that the build of the show-case has placed these goods in a position almost out of sight, except from the interior of the stall. At the front of the stand are two trophies of breast pins—one, in the form of a horse-shoe, being composed entirely of horse-shoe and sporting patterns, the other of a pleasing variety of fancy and set pins. In the former we notice the great number of different pattern horse-shoes—hunter, flat, cart horse, etc., relieved with others introducing the "frog" of the horse's hoof. The second trophy is noticeable on account of the artistic and fanciful designs shown, many of which are very pleasing and show a good amount of artistic knowledge and skill on the part of the workmen, who, we believe, make all the patterns themselves. The use of pearls and coloured gems, and deft touches of "lapping" to relieve the monotony of the dead coloured gold, is well illustrated, and tells of a keen eye for effect. We were amused by noting also a series of trade emblems—files, saws, tweezers, &c., in miniature, worked up in gold as pins. The remainder of the exhibit is composed of links, solitaires, and links, solitaires, studs and collar stud *en suite*, but the case is rather too crowded to allow effective display. We again notice here the great variety of patterns, some pretty, some passable, and some, to use a local expression, "well—ugly." A special feature in this collection are the "fancy shape" links—torpedo, dumb-bell, cannon, kidney bean, &c., in grotesque combinations—a style of link introduced and largely worked by this firm. Small work of this class does not give much scope for an imposing exhibit, but variety of style is gained by the use of engraving, and also by raised masonic and horse-shoe devices, the solitaires especially showing well in this form. There are also shown specimens of the goods "dry coloured," that is finished bright and burnished, in good contrast to the "frosted" surfaces of the ordinary coloured work; while a select sprinkling of diamond and gem-set links, solitaires and suites attest that such work receives careful attention from the exhibitors. We cannot leave this portion without noting the excellent workmanship and perfect finish of the articles, and we wish they had been placed so as to be seen to greater advantage. This exhibit is specially useful as exemplifying how closely, in these plain coloured gold goods, "Brummagem" can approach the so-called London finish.

Messrs. **Browett, Ashberry & Co.**, Dean Street.—The silversmith's art is well represented by this firm, whose display comprises domestic services of new and improved designs, such as tea and coffee sets, biscuit boxes and dessert services in oxidised silver and gold, hot-water dishes, &c., &c. An improvement on Loysel's patent urn which was awarded the medal at the Paris Universal Exposition, 1867. Browett & Ashberry claim to have made Loysel's principle adaptable to urns of different designs and more graceful outline than the original patent admitted of, while simplifying the inside apparatus (extractor and filter) without impairing its efficacy, and rendering it more expeditious in use and easily cleaned. By having the inside apparatus in duplicate, fresh lots of tea and coffee can be made without delay, rendering these urns specially suitable for hotels, refreshment rooms, &c. An improved heat non-conducting handle-socket for tea and coffee pots is also deserving of notice; the effectiveness of the non-conductors completely preventing the handle from getting hot and becoming loose, which nearly always occurs with the ordinary methods of fixing, after the pot has been in use for some time. The A 1 tinned copper bottoms for "old silver shape" and flat-bottomed pots, which prevent their bending and warping and generally increasing the strength of soft metal pots, should also be largely adopted. Want of space prevents our going further into the details of this interesting exhibit, besides which, any general description such as could be given here would be quite inadequate to convey a just impression as to its merits; we, however, strongly advise visitors to the Exhibition not to overlook it.

Messrs. **T. & J. Bragg**, Vittoria Street.—One of the most important and interesting exhibits of jewellery in the Exhibition is shown by this leading firm. The exhibit comprises: the Royal Fan, the wedding present of Her Majesty to the Princess Beatrice, which has been lent to the firm for exhibition on this occasion; the frame of the original model for the medallion struck by order of the Queen in memory of the late Prince Leopold; the gold and enamelled key-brooch presented to Lady Leigh on the opening of the Birminghan Eye Hospital; the silver key presented to Mr. John Bright on the opening of the Cobden Coffee House in Birmingham, in 1883; the Pass for the Royal Commissioners of the Colonial and Indian Exhibition; presentation gold keys, &c.; and masonic and other jewellery of every description. But the most striking feature of the exhibit is the unique collection of mayoral chains, maces and other insignia. Messrs. Bragg have for a long time occupied a premier position in the manufacture of this branch of jewellery, of which they make a specialty, and the collection of thirty-one chains and insignia of office here shown, lent by the various corporations to whom they appertain, fully sustains their high reputation, and forms a display of the greatest historic and archæological interest. From the special pamphlet issued by the firm in connection with their display at the present Exhibition, it appears that previous attempts to obtain a complete collection were only partially successful, ten of these chains being shown at a Society of Arts Conversazione, in 1879, attracting considerable attention at the time and leading to the hope of a larger collection being made at a future period, while several were displayed at the International Health Exhibition in 1884, in the section allotted to illustration of the work of past students of Schools of Art, on which occasion a silver medal was awarded to Mr. J. W. Tonks, for excellence of design in these articles—a distinction which the examiner of the present exhibit will endorse as fully earned. We are reminded that the design and motive of the chains and badges are distinctly modern, although the style in many of them indicates the period at which the corporation commenced its history, and that although the official chains of some ancient boroughs are both old and curious, they can hardly be said to have indicated the municipal spirit, some indeed embodying local or national emblems, but the greater part consisting of various bands of ordinary Albert chains attached at intervals, or of bold and unmeaning coils of gold tube. An inspection of the various chains, &c., here exhibited will show the observer what amount of success has attended Messrs. Bragg's efforts in the direction of making municipal and historical emblems of these chains and badges, the idea having been to make the chain a record of successive occupants of the civic chair, while the design of the badge suggested a heraldically historic description of the borough and its surroundings. We select the two following chains for illustration and description :

The Mayoral Chain of Swansea.

In general style the chain is Gothic, being formed of a series of enamelled links, doubly connected by the letters S S, which are arranged on either side with civic fasces, alternating with naval tridents. The S S link is derived from the old Lancastrian collar, and, at the same time, forms a rebus on the name of the town, in old times divided Swen-sey. In a series of forty richly emblazoned shields, executed in enamel, is conveyed the history of the chief magistracy of the borough since its incorporation. Pendant to this chain, from a centre link of Gothic design, bearing upon a shield in front the arms of South Wales, and upon the reverse the bearings of the former Princes of Glamorgan, both surmounted by the jewelled coronet of the principality, is the badge itself. Its main features are the arms of Swansea, in enamel, upon a crusader shield, having as supporters, the golden lion of De Breos, the first Norman lord of the manor, and the silver panther of the Duke of Beaufort, the present lord. On the large shield is a mural coronet, surmounted by the lymphad or mediæval galley, the crest of the town, with pendants, displaying the cross of St. George. On either side of these appear the heads of the two maces, placed in saltire, being exact facsimiles in miniature of those belonging to the corporation, presented, one in silver by James I., the other in gold by George III. The principal feature of the lower part of the badge, as regulating the form of it, is a large anchor in platinum, round which are arranged nautical emblems—oars, paddles, spars and cordage. A head of Neptune in repoussé is introduced, with long flowing beard, and fishes issuing from it, while enamelled ribands, entwining with the trophies, bear the motto, "*Floreat Swansea.*" The reverse of badge displays the decorative features as in front, every part being complete, except that the shield bears an inscription and the donor's name, while amidst the wreath work, clustering round the base, is the smallest silver coin of the realm, the Victorian penny, to mark date of presentation.



The Mayoral Chain of Swansea.

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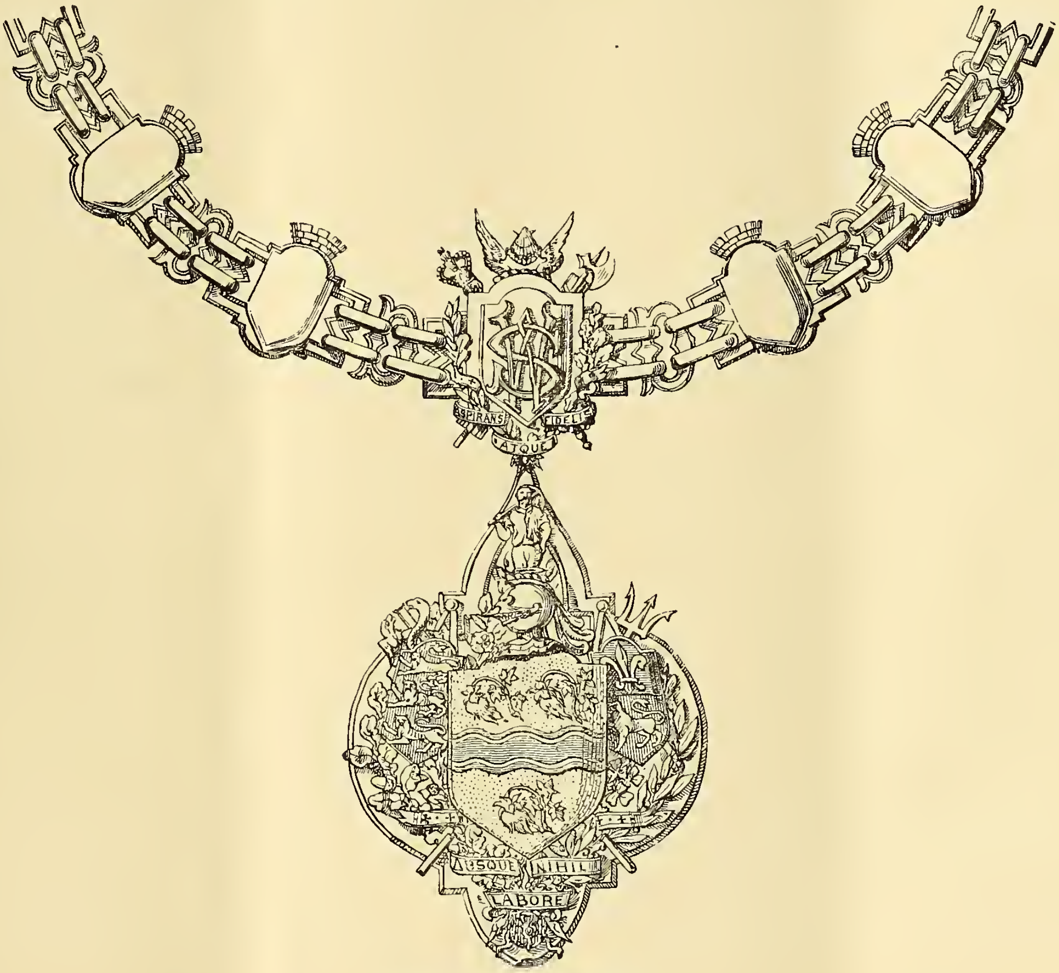
Mayoral Chain and Mace, Darwen.

The chain is of 18 carat gold, hall-marked, full length, of Italian Gothic design, the letter D, initial of the borough, recurring at intervals as connecting links, and between them larger links bearing shields, on each side surmounted by embattled crowns, symbolical of civic dignity. The centre link, larger than the rest, is occupied with monogram in enamel of Mr. William Snape, the first mayor, and is surmounted by his crest, "Wings and Escallop," also in enamel. Below is the motto "*Constans atque aspirans.*" There is also a suggestive decoration including a mayoral mace and fasces, arranged as a trophy, enwreathed with bays. The badge of office proper depends from the centre ornament, style of design, Italian Gothic, all ornaments bearing relationship to the subject, and enamelling showing three different modes. The shield in centre bears the arms of the borough, sprays of the cotton plant in full bearing, and in proper colours, divided by the blue wave ornaments which are the heraldic rendering of the river that runs through Darwen, with its two tributary streams. Above a helmet closed and plumed, the crest of the town, a miner with his pick, and at his feet a shuttle; the small figure carved in gold and painted in enamel. At the foot of the shield runs the motto, on an enamelled riband, "*Absque nihil labore,*" nothing without labour. The county is expressed by the arms of Lancaster, a shield on the left fully emblazoned; on the right another for the country, bearing the three lions of England on a red field; the red rose of Lancaster shows beneath. The trident of naval supremacy, and caduceus of commerce, appear as accessories. The rose, shamrock and thistle suggest the three portions of the United Kingdom, while the design is enwreathed by the oak and laurel. The mace is of massive silver, the arms, as before described, fully emblazoned on the body; the oak, laurel and cotton plant form the basis of the enrichment.



The Mayoral Chain of Darwen.

Meeting of Watch Case Makers in Coventry.

On Wednesday evening, 13th October, a large meeting of the Coventry watch-case trade was held at the Newdegate Arms, Hill Street. On the handbill calling the meeting, its object was stated to be "to consider the fraud now practised in the watch trade by the Hall-marking of foreign cases." Amongst those present were Messrs. J. Walker (who was voted to the chair), A. Beale, W. Gee, J. Hallam, E. Boileau, W. Hickman, E. Walker, R. Gravenor, C. Jackson, F. Willday, F. Vernon, J. Richards, W. Waithman, — Eagles, A. Waterfall, J. Brothers, &c.

The Chairman, in opening the proceedings, said although he was not now intimately connected with the watch case trade he had had a long experience in it, and his interest would never flag as long as he lived. He was not prepared to take any active part in the movement, and should like his functions to cease with that meeting. Ten years ago he was engaged in the campaign. It then entailed an immense amount of labour, and he should not at his age care to go through the mill again. As showing the interest he still took in the movement, he might say that eight or nine months ago the Coventry Chamber of Commerce had a communication from the Royal Commission on Depression in Trade, containing a number of questions relative to the trade of the district. One of the questions was: "Are there any special circumstances affecting your district to which the existing condition of trade there can be attributed?" He, with a good deal of trouble, got inserted in answer to that question, that the present system of marking the cases of watches of foreign manufacture with the stamp of the Goldsmiths' Co. was, in the opinion of the Chamber, injuriously affecting the watch trade of the district. That would bring the question under the notice of that Commission and was the best that could be done at that time. His idea was that the movement now merely wanted taking up again at the point where it was left by the late Sir Henry Jackson in order to bring about what they all desired. After the lapse of time the English Hall-mark had become a kind of trade mark, and was looked upon as a guarantee of thoroughness, and that the articles bearing it were of English manufacture. If that were not the case, why did the foreigner want to have the English Hall-mark stamped upon his goods? It was better to him than his own: and it was used to supplant Englishmen in the eyes of the world, and to pass foreign watches off as those of English manufacture. It was a fraud to all intents and purposes, quite as much as if they were infringing a properly registered trade mark. They might be told by the officials of the Home Office that they were asking for "protection," and that the trade must be free for everybody; but he (the chairman) thought that if the foreigners would come to England and work their establishments here under English conditions with the same expenses, they might legitimately adopt the English Hall-mark, but not otherwise. His view of the question was that the trade would not have been in its present depressed state if they could have stopped this Hall-marking ten years ago. On the occasion of the last inquiry he and others produced watches of Swiss manufacture from beginning to end with nothing English about them but the Hall-mark, and these watches were being sold by an English firm for far above what Coventry watchmakers would make them for, and they were labelled "Our own make, £4 10s." Their intrinsic value was about 27s. 6d. each. The chairman then read a circular from Mr. Newman, who was well known in the movement, stating the reasons why the English watchmakers objected to their Hall-marks being struck in foreign watch cases. The circular also contained a draft of the Bill submitted to Sir H. M. Jackson for the protection of the trade, but stated that it was considered that such an Act would not effectually remedy the evil. Another Bill was suggested, providing "that none but the actual worker or maker of gold and silver watch cases to be assayed and marked, should register their names, place of manufacture and name marks, any persons falsely registering themselves as such to be liable to a penalty of £....... That the English Hall-marks should only be struck in watch cases actually manufactured in England and made to English movements: and that the authorities of the assay offices, having suspicion that any watch cases sent to be assayed and marked are of foreign manufacture, should require the person sending such work to make a statutory declaration whether of English or foreign manufacture; upon refusal, the assay authorities to have power to refuse to mark or assay the same. That any person being proved to have got foreign watch cases assayed and marked as English cases or English cases made to foreign movements shall be liable to a penalty of £....... That upon the note or memorandum paper sent with each parcel of work the following declaration shall be printed and signed by the person sending such work:—'These cases are of my own manufacture, and made to English movements.—Signed, A.B.'"

This was only suggested as a basis of a suitable Act, and if certain portions could be drafted on the Bill, as introduced by Sir Henry Jackson, every requirement would be met.

The Chairman then asked for any suggestions.

Mr. Richards suggested the appointment of a committee from the present meeting to arrange preliminaries for a larger meeting.

The Chairman, however, thought they would not get a larger or more representative meeting.

Mr. Eagles said the idea of those who had called this meeting was to get the case makers united with a view to co-operating with the watch manufacturers, so that the whole trade could present a united front.

The Chairman said in that case it would be well for any committee appointed that night to open up communications with the Watch Manufacturers' Society.

Mr. Styles suggested that the Coventry trade should act in concert with the Liverpool trade, and get the support of the nine Liverpool members of Parliament for any action that Mr. Rowlands, M.P., might take for the redress of their grievances. He had written to a friend engaged in the trade at Liverpool, calling his attention to the movement inaugurated in London, and asking whether Liverpool intended to take any action. His friend, who was prominent in the movement there, replied—"The movement in London to which you refer has been brought to my notice by Mr. Newman, with whom I am in communication. I trust we shall be able to make a move of some sort here; at any rate I am taking the matter in hand and hope to succeed. Of course we cannot expect to make a big show, as there are so few left, and the trade is utterly disorganised. Naturally I am pleased to hear that you are getting together in Coventry, and do sincerely hope that we all shall try and close our ranks and fight for the main object. Our failure last time was largely due, in my opinion, to the dissension among ourselves, and by everybody wanting to trot out his own particular quack remedy. I trust that we, one and all, will try and avoid this in future. Let us have a well-defined object in view and go straight for it. If we try to trim our sails to catch this one and again to catch another, we shall certainly fail as we did before. Those who are not with us must stand aside or be against us. Better an enemy in front than in our ranks. Towards the end of this week we shall, I hope, be making a start, then we shall want to be put in official communication with your committee."

The Chairman agreed that any action taken by Coventry ought to be concurred in by Liverpool, for Coventry with its one member would cut a very poor figure without the aid of Liverpool with its nine.

The discussion was continued by Mr. A. Beale and Mr. Jilks, the latter pleading for a more united action between manufacturers and workmen than was exhibited on the occasion of the last agitation.

Ultimately the following gentlemen were appointed a committee to communicate with the Liverpool and London trade, and with the Watch Manufacturers' Association:—Messrs. Styles, Eagles, Fleckner, Hickman, Sexton, Willday, Richards, Jackson, Shortley and Hallam. On the suggestion of the chairman, the committee was also instructed to wait on the employers of labour, asking them to allow themselves to be added to the committee.

It was decided to levy a subscription of one penny per week on all workmen in the trade, towards the expenses of the movement.

A vote of thanks to the chairman concluded the proceedings.

The London Watch Trade.

The first meeting of the London Watchmakers' Trade Association was held on Wednesday, 13th October, at St. Peter's School, St. John Street, Clerkenwell, under the presidency of Mr. S. A. Brooks. The association is the outcome of the agitation which is being carried on to prevent the English Hall-marking of foreign watch cases—a practice most extensively resorted to by foreign manufacturers—and the consequent sale of foreign watches as of English make. The object of the new organisation is to "promote union amongst all the working branches of the watch trade, so that they may act in concert to remove any evils from which the trade may suffer, and to further any purpose which may be for the permanent interest of the trade." Captain F. Penton, M.P. for Central Finsbury (Clerkenwell), is president of the association, and Sir Albert Rollit, M.P., Colonel Duncan, C.B., M.P., Mr. James Rowlands, M.P., and the Rev. B. O. Sharpe, are included in the list of vice-presidents. The chairman remarked that the movement which had resulted in the formation for the first time of a trade protection society in the interest of London watchmakers was the most successful movement in the trade that he remembered; and he explained that the organisation was in no way intended to be antagonistic to English watch manufacturers, who, in common with the operative watchmakers, had suffered severely from the fraudulent practices which prevailed in the fact

EXHIBITION. No. 150. } British Association for the Advancement of Science, BIRMINGHAM MEETING, 1886.

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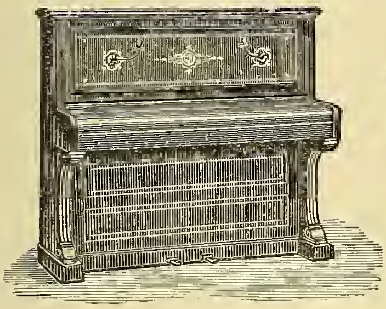

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At the Sydney Exhibition, 1880, two First-Class Awards were obtained; and although the Watches were not expected to be entered for competitive trial, they obtained, at the Government Observatory at Sydney, higher marks than those of any other Exhibitor.

of dealers selling foreign watches as of British make. This they were enabled to do because of the English Hall-mark which the law allowed to be impressed upon foreign cases that were retransmitted abroad, filled with foreign movements, and returned and sold in the United Kingdom as British-made goods. Rules for the government of the association were adopted, many members were enrolled, and it was intimated that the watchmakers of Coventry and Liverpool were likely to join as well as those of London.

Electric Clocks.

By J. Stephen.

(Continued from page 62.)

The electrically controlled clocks we have been considering must, of course, depend for their good timekeeping upon the good behaviour of the parent clock. This parent clock is generally a good sidereal clock placed in an observatory, where it can be well looked after by trained observers, have its time compared day by day with the transit of the sun or some of the useful stars, and have all errors carefully eliminated. The necessity for this good timekeeping is a curious outcome of the railway and the telegraph. In the old times it was well enough to trust to the sundial; and the noon of Edinburgh served very well for Edinburgh and its neighbourhood, while the noon of Glasgow—nearly five minutes later—served for those who lived within sight or sound of its steeple clocks and bells.

Ireland has elected to have a noon of its own; and when one reaches Belfast, having started from Greenock with a watch set by the best clock there, one finds it necessary to put the hands back about twenty-five minutes—so much are the Irish behind Greenwich time.

England, Scotland and Berwick-on-Tweed accept Greenwich noon. There is really a very considerable difference between the noon of Greenwich and that of Edinburgh; and on an hour's railway journey east or west one would require to change one's watch by nearly five minutes, if one were, at each new resting-place, to accept the real noon.

Such a state of things would be very confusing and annoying, and the institution of clocks electrically synchronised by the Greenwich sidereal clock, with the system of time-guns now introduced into large towns, makes possible the maintenance of a very near approach to a universal standard of time. A Scotchman may well complain that, in order to keep abreast of the London man, he must get up very early in the morning; but, perhaps, after all this may be only a thing foreseen when the introduction of Greenwich time took place, and hailed by the Southron as a good way of handicapping his proverbially astute neighbour.

With these facts in face of them, and with a growing appreciation of the value of time, clockmakers have tried more and more to simplify and cheapen good timekeepers.

Nothing can be more satisfactory than the clocks which have a Bain pendulum and a weight-driving arrangement, as in the Jones type of clock, or a propelment, as in Ritchie's. But Mr. Bain had himself foreseen that in many instances it was not necessary to provide for more than an hourly synchronisation of clocks, and he has described a quite simple and adequate means by which clocks can have their hands placed once an hour, or, it may be, oftener, in the exact position that the hands of the parent clock are then occupying.

Mr. Bain, in a pamphlet published in 1843, described minutely his method; and it will be seen that all the modern methods are merely modifications of, sometimes by no means improvements on, his plan.

Behind the dial of the clock is placed an electro-magnet, which of course is to be energised by the parent clock closing a current at the proper moment. The energising of the electro-magnet will pull down an armature, and this armature carries a rod ending in a V or fork, normally; that is, when the electro-magnet is not energised, occupying a position slightly nearer the centre of the dial than does a pin projecting from the minute hand of the clock. If the correction is to take place at the hour, the V will of course occupy the position of the centre of the figure XII.

Assume that the minute hand is a little slow, and that it is occupying a position a little to the left of what it ought to do. Now the magnet is energised the V-shaped fork moves upward, and the pin borne by the minute hand must needs pass to the bottom of the V and thus the hand be caused to occupy its proper place. Had the hand been too much to the right, *i.e.*, a little fast, the movement of the V upon the pin would have pushed the hand backward.

This correction, in every case, would take place at the 60th second of the 60th minute of the hour, and the action of the corrector would always put the hand right, if the latter were at all within the range of the two arms of the V. Nothing can be more simple than this, and all the "improvements" upon it, with the exception of those of Mr. Ritchie, of Edinburgh, are "improvements" only in name.

Mr. Ritchie gives full credit to, and is, indeed, a generous defender and hearty upholder of Bain's reputation. In a paper read before the Royal Scottish Society of Arts, Session 1877-78, Mr. Ritchie points out two difficulties which he met with in certain cases when using the Bain method. The clocks to be fitted with the correctors were seldom fitted with maintaining power works, that is, they did not go when being wound up, and, in consequence, the wheel-work went backward when the operation was being performed. Thus, if ten seconds were occupied in winding the clock, it would be twenty seconds slow after the operation. To correct this error the arms of the V would require to cover nearly a minute, which would necessitate either a very obtuse angle of the V, and, therefore, a great deal of battery power, or, on the other hand, an angle as acute as before, but with much longer arms to the V, and, of course, a greater distance between the armature and the electro-magnet poles.

The other drawback Mr. Ritchie found, lay in the fact that the clock hands require to be very loose in their connection with the wheel-work, to allow of the corrector pushing the hand backward or forward, and this in the case of large clocks without glass faces, and exposed to wind and weather, made the necessity of an arrangement allowing for more secure attachment very apparent.

Mr. Ritchie's first way of obviating the defects was to substitute the I, or block, system, by removing one limb of the V and placing the other at a smaller angle to the pin on the hand. This, of course, necessitated his giving the clock a slight gaining rate. Instead of a momentary signal, one of fifteen seconds duration was sent, commencing at the 59th minute 45th second of each hour and ending at the 60th second, or the exact hour, of the parent clock. By adopting this plan, Mr. Ritchie found himself able to decrease the battery power very much, as the block had but a small distance to move. He was also able to secure the hand more firmly to the wheel-work.

As Mr. Ritchie aimed at applying correctors to all sorts of clocks, he found that even this latter plan did not always suit every kind. Sometimes, where the hands of the clocks were light and elastic, the driving power of the clock would be sufficient to bend the hands, and make them overleap the block. The friction of the hand on the block, being pressed with all the force of the wheel-work, sometimes prevented the block from falling clear when the current had ceased.

Altogether, Mr. Ritchie saw reason to reconsider the whole matter, and he succeeded in devising an arrangement which seems indeed to meet every requirement. The idea he worked upon was evidently suggested by the trouble he had with the strong clocks jamming or bending the hands when he used the I block method. He resolved to stop the clock and not merely the hand. The problem is a double one, for though the clock be stopped at the right time the hand may not be at the right place. The way this problem was solved is extremely neat.

The clock, as in the previous plan, is arranged to gain time slightly, or, at all events, not to lose. The amount of gaining time is of no consequence, and may be one second in a week or forty minutes. The minute hand will therefore arrive at the hour always a little early: the aim is to arrest its progress to that extent.

An electro-magnet is provided, and over its poles is pivoted, at the fulcrum *C*, an armature which carries two prolongations: one of these we shall call the lever *D*, the other the lever *E*. The electro-magnet gets energised fifteen seconds before each hour. Were the armature free to move, the lever *D* would now, by means of a pin on its distal end, stop the scape wheel till the current ceased again. But the lever *D* cannot rise because the distal end of lever *E* presses against a disc carried by the minute hand and prevents the armature from getting "home," and consequently the lever *D* from stopping the scape wheel. When, however, the hand passes to the 60th second the distal end of the lever *E* slips into a notch, the armature can now get "home," and the lever *D* can stop the clockwork. Immediately, the parent clock ceases to close the energising current, and the levers fall backward. The clock starts for the new hour with its hand right, and nothing of a correcting kind happens till again the 45th second of the 60th minute is reached. Then as before the electro-magnet gets energised, but the clockwork cannot be stopped till the hand shall have reached the proper position. The hand we have seen to be always quite up to time, the device is thus a retarding one.

Mr. Ritchie points out one advantage of this method, and it is one that must appeal to everyone who has to do with electrical circuits. He points out that the line may be tested or have currents passed through it at any time without affecting the clocks in the circuit in any way; the electro-magnets are indeed energised, but the position of the disc on the minute wheel prevents any movement of the armature, which indeed can never move save when the minute hand is standing at figure XII.

Mr. Ritchie has a large number of clocks arranged in series and corrected in this way. He puts a pilot electro-magnet in the circuit where it can be seen. This pilot electro-magnet will not work at all if the electro-magnets along the line will not; its armature is accustomed at each hour to move forward a hand one division. If it fails to do so, the failure is at once noticed, and steps can be taken to test the line for failure of insulation or break of continuity.

Mr. Ritchie's system only corrects a clock which gains time, and will not affect it should it go slow. This we by no means consider a defect, but quite otherwise. Should anything go wrong with the wire the mistake would show on the right side. It is a small matter that a clock should be a little fast. The defect would probably be set right before the error became great. Mr. Ritchie would find no difficulty in arranging for the correction to take place either way, but probably he is quite alive to the advantages of great simplicity in electrical arrangements, and so far as we can see there is not the slightest necessity for any modification of a plan which seems to work quite well and at so small a cost.

Why vestries and public bodies do not have the clocks under their charge corrected in some such simple way as this, is one of those questions which only vestries and public bodies can be expected to answer. It is very amusing—it would be if it were not saddening—to see the public all agog over some new and perhaps rather foolish invention for doing inadequately and expensively what has for so long been done quietly and in a simple and inexpensive way.

Probably, nay certainly, were Edison to invent some electrical means of regulating or driving clocks, every daily newspaper in the lands *cis* and *trans* Atlantic would hail it as a veritable marvel, and editors would wax eloquent over the tremendous and far-reaching consequences and benefits.

(To be continued.)

Technical Education.

SIR PHILIP MAGNUS, of the City and Guilds of London Institute, addressing the pupils of the Liverpool School of Science, cited the proceedings at the Bordeaux Congress as evidence that technical science engaged Continental attention. It was generally admitted that apprenticeship, as formerly understood, was a thing of the past; but no perfect substitute had been found for it. There was too much hurry and too much competition in the workshop nowadays for lads to obtain a really useful knowledge of trade. Hence technical education was absolutely necessary to supplement that of the workshop. Foreign competition was largely due to the superior knowledge of foreigners; and to counteract this, secondary schools and suitable classes should be instituted, that youths might, after leaving school, complete a commercial education. Paris and other Continental cities have founded such institutions. Sir Henry Roscoe was about to bring before Parliament the importance of taking steps to carry out the recommendations of the Technical Education Commission. Should these recommendations be adopted, evening commercial technical classes would, in this country, as abroad, receive municipal aid, and individual effort would not be taxed so much as at present.

On Friday, 8th ult., at the invitation of the committee of the Nottingham College, a number of lace manufacturers, as employers of labour in the town, attended in conference in the College building, to discuss the best means of making the Technical Schools attached to the institution most serviceable to the local industry. Professor Stuart, M.P., was among those present. After a good deal of discussion a committee was appointed to consult with the College authorities as to what steps should be taken to make the Technical Schools thoroughly effective. Subsequently Professor Stuart presented the prizes to the successful students. He spoke of the rapid strides which Continental countries had made in technical education, and said that unless England took some steps in this matter she would fall seriously behind in the race of manufacture and commerce.

On Saturday, 9th ult., Mr. J. Rowlands, M.P., presided at the Finsbury Technical College, Leonard Street, over the first of a course of free Saturday evening lectures on scientific and technical subjects. In doing so he remarked upon the neglect which had occurred in the past, so far as our educational system was concerned, in the development of technical instruction. As a handicraftsman himself—as one who had served an apprenticeship to the watchmaking trade—he had practically realised the want of technical education in this country. While foreign nations had been devoting great attention to this important subject, and affording all the facilities in their power for the extension and development of technical training, we in England had, to a large extent, stood still; and then we had been surprised, perhaps, that foreigners had gone ahead of us in many branches of manufacture. The old apprenticeship system had broken down—it might be considered to have quite passed away—and its only substitute was the provision of a thorough system of technical education accessible on easy terms. His notion of technical education was simply the development, to the utmost extent of his capacity, of the faculties of a person who wanted to learn a particular craft. Drawing was only now becoming generally recognised as necessary to be taught in the elementary schools as preparatory to the education which youths were enabled to follow up in that and kindred institutions on leaving the primary schools. He found that in handicrafts where we were supposed to be beaten by foreigners the superiority of the latter arose from that system of technical education which their Governments—notably those of Switzerland and Germany—had been careful to provide and foster, and in which England was lamentably deficient. He believed that the English workman had just as much capacity to learn the scientific principles governing his handicraft as the foreign artisan; but the former lacked the facilities to this end which the latter had long possessed. As an instance of this, he mentioned that a British manufacturer whom he knew had been obliged to engage foreign artisans to teach their English brethren the particular processes of the craft which the manufacturer carried on; and so readily had the latter acquired the needed knowledge that the employer had soon been able to dispense with the foreign workmen, and now only Englishmen were

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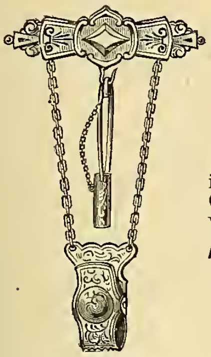

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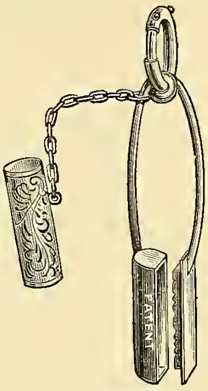

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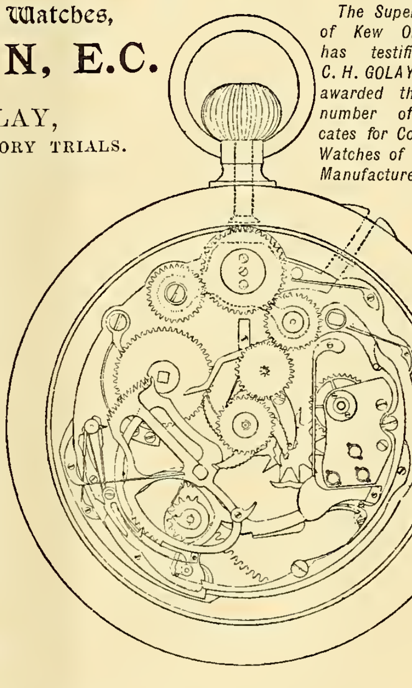

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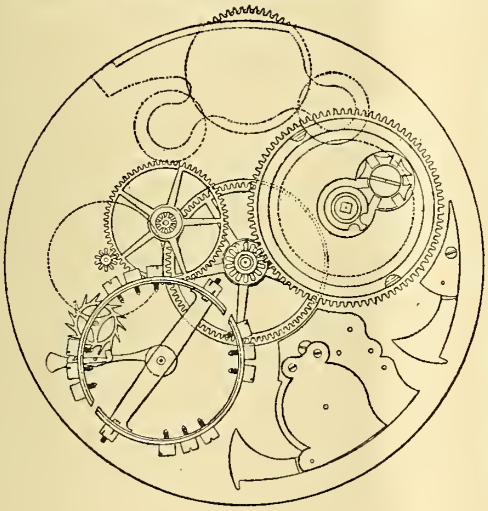

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Keyless half-quarter repeater	64.8
Keyless minute repeater, minute chronograph	71.6
Keyless minute repeater	75.7
Keyless minute repeater	76 2
Keyless minute repeater	78.3
Keyless fly-back minute chronograph	68
Keyless fly-back chronograph minute repeater	60.6
Double fly-back keyless chronograph	50.0
*Keyless minute repeater, minute chronograph, perpetual calendar watch	69.5
Keyless minute repeater	73.1
Keyless minute repeater	65.8
Keyless minute repeater clock-watch	75.3
Keyless $\frac{3}{4}$-plate	64.9
Keyless minute repeater, perpetual calendar, clock-watch	65.7
Keyless $\frac{3}{4}$-plate	68.4
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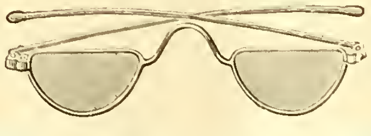

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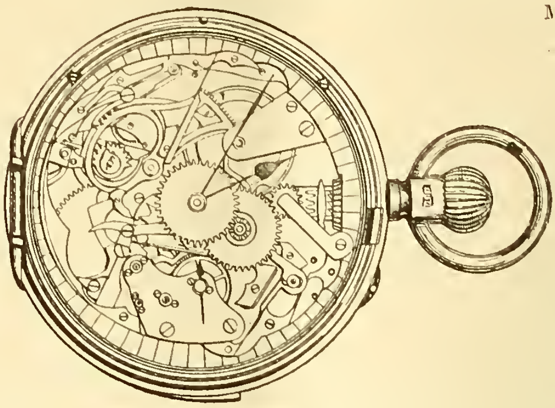

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retained by him. In the great race for wealth that characterised contemporary commercial life, we had unfortunately become too much of a nation of mere dealers in goods instead of manufacturers of them. The grand and ennobling idea of superior craftsmanship had been subordinated to mere questions of sale and barter and profit-making, if indeed it had not been altogether ignored. If we were to hold our own as a manufacturing nation, the development of handicraft rather than the ready sale for profit of goods on the part of a mere dealer must be fostered and encouraged. The existence of the Technical College was a tardy acknowledgment of the need for thorough technical education; and he hoped that before many years had elapsed similar institutions would be studded all over this vast metropolis. Professor Perry, F.R.S., then delivered a lecture on "Spinning Tops," in which he spoke of gyrating bodies generally, and the wheels of engines, and interested a crowded audience.

The proposed Technical Institute for Coventry.

Mr. Alderman Tomson, writing to the Coventry papers, says:—"A short statement of the position and prospects of the contemplated Technical Institute would, I believe, be interesting to many of your readers, and the sympathy you have shown with the project, and the support you have given to it, lead me to hope that you will allow me this opportunity of giving publicity to such a statement.

"The promised donations have been somewhat reduced, partly through death and partly through delay; but still, with the Government grant of £500 and the anticipated surplus from the sale of the Coventry Institute, there appears to be nearly sufficient for the building, according to the plans already prepared and approved.

"The failure of funds from either of these sources will render the carrying out of the complete scheme impossible, and the Horological and Textile departments will have to make greater efforts than they have yet done to raise money for the working educational expenses to make them as successful as the committee would desire.

"The Science Classes and reading-room are going concerns, and will be self-supporting when once they are provided with a suitable home.

"Under these circumstances the committee have decided upon calling in the promised donations under the conditions of the resolution annexed. They will then make the final appeal for the Government grant, for which an official form will be submitted for signature at the annual meeting of the Coventry Science Classes on 19th October; and if that be forthcoming, they will proceed to offer for sale the Coventry Institute building.

"Should these efforts fail to produce the necessary amount within a given time, the donations will be returned in full, unless some donors prefer to devote their gifts to a less ambitious scheme, in which case they will be called together for consultation.

"A little more self-sacrifice for the good of the next generation, a little addition to the numbers of those who have given such generous help, will yet enable the Committee who have worked hard in this movement to carry out a scheme which they believe will be of inestimable benefit to the community; but if such aid is not forthcoming, an opportunity will be lost which may not again present itself in our generation.

"The names of the members of the committee are sufficient guarantee for the fulfilment of the decision arrived at, and I would ask for a speedy response to the appeal for payment of donations promised—or a notice of intention of withdrawal, in order that we may proceed on the lines indicated. The resolution runs thus:—'Resolved, that no contract for building be signed until the donations paid, the Government grant promised, and the balance arising from sale of Institute are sufficient to cover the cost of building, and that unless these conditions are complied with in six months, the scheme be abandoned, and the donations be returned.'"

Watch Jobbing.

By X. O. N.

(Continued from page 97.)

New Mainsprings.—It would be quite useless to lay down any rule for the length or strength of mainsprings to be put to job watches, as in nearly every case the matter is arbitrary and must be determined, not by any principle, but by the work the mainspring has to do. In full-plate watches the balances are generally too large, and if the escapements are also large and not very good, a spring as strong as the capacity of the barrel will admit will be required. The number of turns of the spring in the barrel is no sure indication of the number of turns the barrel will make by the spring unwinding, as the spare space in the barrel, which is partly governed by the size of the barrel arbor and partly by the thickness of the spring, determines the number; but the mainspring should only occupy half the space of the barrel bottom with the arbor in its place.

If a jobber can possibly send his barrel to the only springmaker we have left in England, Mr. G. Cotton, he will find it to his advantage, as he will then get a proper spring fitted, that is, if it be for a fusee watch. Swiss springs are not fit for fusee watches, as they are made of an equal thickness throughout, instead of being made thinner at the eye and tapering from the hook; this tapering gives the spring a freer action in the barrel and decreases its liability to break, as springs generally break in some of the inner coils, and the thicker the spring, the greater the risk of breaking. In all old English watches the mainspring is attached to the barrel by a square hook in the spring and a corresponding hole in the rim of the barrel; but occasionally one finds a brass or steel pin put into the barrel, and the square hole left as a witness of bad workmanship. This is very sorry work, and if it is done to save time it is a mistake, as there is no difficulty in making and applying a square hook to the mainspring. If a piece of oblong steel (barrel-hook steel) is fitted to the hole in the barrel, and a mark made with a sharp point on the steel inside the barrel, it will be seen at what angle the pivot or rivet should be made on the steel. The rivet can be filed on the steel, but this is not easily done by everyone, and a simple tool for cutting this pivot is easily made: Take a piece of square steel the length of a drill stock, centre one end and fix a ferrule on it; drill a hole in the other end or face of the tool (the size required for the pivot); cut saw teeth across the face, which should be a little rounding, and harden the face; the tool is then ready for use. The end of the steel where the pivot is to be made should be filed away from the back and a centre made so that the pivot shall be well in front of the hook; but, as the hole in the barrel is not always in the centre of the rim, the pivot can be made first, and the hook filed to accommodate the hole in the mainspring, should that hole not coincide exactly with that in the barrel.

The hook should be riveted into the spring by gripping the steel some distance from the rivet in a pair of old nippers—the nippers being screwed up in the vice and the rivet made without too much hammering. The end of the spring projecting beyond the hook should be filed away to a knife edge, either before or after riveting the hook in its place, to prevent the spring breaking across the hole if too much strain is put upon it. Watch jobbers generally leave the hook too high, and, when it is in its place in the barrel, file it down flush with the rim of the barrel, thereby removing the gilding and, in many cases, reducing the thickness of the barrel rim. This should not be done; it is spoiling the watch; and it is quite easy to measure the height of the hook by trying it in the hole from the outside and filing it on a cork in the vice to the right height. The hook must not project above the barrel rim; it matters not if it is a little below, but it should be the right height before the spring is wound into the barrel, as there is a great risk of spoiling the spring by taking it out of the barrel if it has a well-fitted square hook.

Great care should always be taken when winding a spring into a barrel; the winder should be quite true and never smaller than the barrel arbor.

The best method of attaching a mainspring to a going barrel has given rise to much controversy, any addition to which would be out of place here; nor would it be very useful to watch jobbers, that matter being usually settled for them, as a new spring must be hooked in as its predecessor has been; and, as it is now the universal practice to put a simple steel hook in the barrel and a hole in the end of the spring, it is only necessary to see that the hook projects very little beyond the eye of the spring, and that it is at a sufficient angle to prevent the spring from slipping off. The hole in the spring should be oblong, and may be made with the lever punch, which is much used for this purpose. The hole should be square at the end and bevelled off from the inside to give it a good hold on the hook; and the end of the spring beyond the hole should not be left longer than what is necessary for strength, but should be made square at the end and rounded off from the outside. One often finds mainsprings choked up by having a quantity of oil put to them which has not been removed when other parts of the watch have been cleaned. The spring in a fusee watch should not have oil put to it; all that is necessary is to see that the spring is put into the barrel in such a state that it will not rust; and the best way to ensure this is to apply a small quantity of oil to a narrow strip of wash-leather, and draw the spring through it before winding it into the barrel. If a strong mainspring breaks in a going barrel, it sometimes breaks a leaf or two out of the centre pinion, as neither Swiss nor English watches are furnished with Fogg's patent pinion; but I have oftener found a broken third wheel pivot to be the result; and if the spaces of the centre pinion were cut round at the bottom, as they should be, the American invention would be of very little use in so far as the centre pinion was concerned. But pivots are broken from many causes, and must be replaced; and when a new pinion is not practicable, a pivot can be put in and, with care, made a very good job of. Supposing the bottom pivot of the third pinion be broken, the best way to put in another pivot is first to cement the wheel into a chuck of a lathe or throw. If neither of these machines are at hand, a balance tool will do. The chuck should be true and flat on the face. A cement made of equal parts of resin and shellac will be strong enough to hold, and will be easily removed from the work afterwards. The flame of a jet of gas or of a spirit lamp applied to the back of the chuck will keep the cement soft long enough, for the work being brought concentric by holding a blunt peg against the projecting pinion arbor, the centre can then be made, not with a graver, but with a sharp auger-pointed tool. The drilling is the principal difficulty. If the pinion be hard, the drill should have a rounded point and be quite hard at the point; it should be left as strong as possible, as some pressure is required to make it bite. The hole need not be deep. When the drilling is done, the hole should be broached and the pivot turned and smoothed so that it fits the hole accurately. Fitting it to go to the bottom of the hole and afterwards taking a piece from its length, is the surest way of making a good fit. The hole and pivot should be cleaned and the oil removed in benzine. A few taps with the hammer will make the pivot as fast as if the pinion were solid. If the pinion head is not quite true, the centre must be filed to get the pinion true, and then the pivot made in the usual way.

The top pivot cannot easily be made in this way. The hole for the pivot is better drilled in the turns, and it is much easier to drill the hole in the top of the arbor than the one in the pinion or lower part of it—as, if the arbor is hard, it can be softened without injuring the pinion or wheel. A brass runner is fitted to the turns, a hole drilled in the end of the runner, near the outside, a little smaller than the pinion arbor, and a chamfer or centre made for the end of the arbor to run in, the runner should then be filed away at the back of this hole, leaving the sixteenth-of-an-inch of the runner its full diameter at the end. If a piece of round steel is made to fit the hole in the runner with a triangular (not a drill) point, hardened of course, and is inserted in the hole in the runner to meet the end of the arbor, and the pinion made to rotate by a ferrule and bow, then the centre will at once be found, and the hole may be drilled in the same manner as that in which the centre has been marked; but both the centring tool and drill will require bending to enable the operator to use them in this position.

It is not often that a fourth wheel pivot can be made a good job of if the pivot carries a seconds hand, as the under cutting of the pinion at the back leaves the arbor too weak. The only way to make a good job is to make a larger and longer hole in the pinion, cutting away the projecting piece of the pinion arbor and making pivot and shoulder both new.

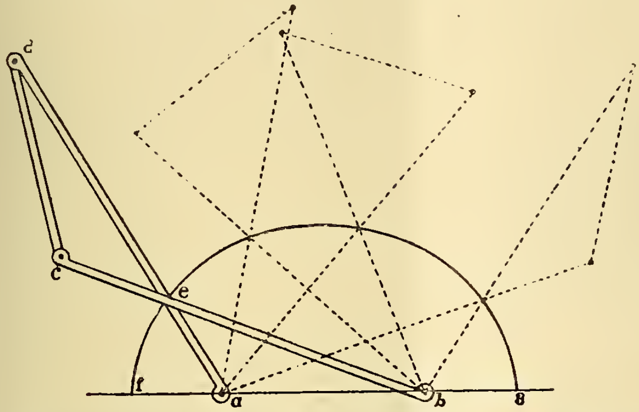
(To be continued.)

The Iron and Steel Institute.

THE autumn meeting of the members of the Iron and Steel Institute commenced at the Institution of Civil Engineers, Westminster, on 6th October, under the presidency of Dr. John Percy, F.R.S. The chairman stated that the council had unanimously nominated Mr. Daniel Adamson (of Manchester) as the president of the Institute for next year. The nomination having been approved, in acknowledging the compliment paid to him, Mr. Adamson remarked that he was the first worker in metals, and the first engineer, who had been elected president. Dr. Percy then delivered an address, in the course of which he said that the best evidence of the continued success of the Institute was afforded by the number and character of the communications received from its members, to the more important of which communications to the present meeting he referred. Speaking of the chemical composition and valuable properties of chrome steel, which he had ascertained by experiments, he said that when cold it exceeded in tenacity every other steel, and when tempered it pierced, but could not be pierced by, any other steel, provided the carbon be the same in each case. It was most suitable for safes and the bars of banks and prisons. He next directed attention to the discovery of the application of aluminium, which he said was destined to play an important part in the iron and steel world, and was of paramount importance and interest to many members, and especially to steel makers. There was no problem relating to steel of greater importance than that of producing with certainty large and sound steel castings, and should the use of aluminium prove the solution of the problem their friends in Sweden were to be congratulated. There had been a marvellous development in recent years in the iron and steel production of the United States. In 1879 the make of pig iron in the United States amounted to 2,741,000 tons, and in 1882 to 4,623,000 tons. Since 1882 the production had not increased, for in 1885 it only amounted to 4,529,000 tons, notwithstanding that the capacity of production had enormously increased. At present the aggregate capacity of all the pig-iron works in the United States was estimated by the American Iron and Steel Association at 9,960,000 tons. In 1879 the production of Bessemer steel in the United States amounted to 928,000 tons, and in 1885 it amounted to 1,710,000 tons, thus showing an increase of 83 per cent. No other country could show such a remarkable increase in the production of iron and steel as the United States, and he felt certain that the production of 1886 would exceed that of any previous year. More than half of the steel produced since 1865 in the United States had been used in the construction of railways. After referring to the lessened cost of production by the use of machinery, he said that their Teutonic neighbours were wide awake, and so must they be if they were to retain their position as regarded the production of iron and steel. But to do that they must not be blinded with their own stupidity by regarding the power of their antagonists with contempt. On the motion of Sir Henry Bessemer, seconded by Mr. Daniel Adamson, a hearty vote of thanks was accorded to the president for his address, after which the conference proceeded to the consideration of the papers contributed by the members. Subsequently the conference adjourned, and the members went to the Colonial Exhibition to visit the principal mineralogical and metallurgical collections in the several courts.

A New Ellipsograph.

Mr. G. B. GRANT, of Maplewood, Massachusetts, U.S.A., writes to the *Journal of the Franklin Institute* (October number):—"There are so many ellipsographs and methods for drafting the ellipse, that a new one can hardly be said to be called for, but the study of the curve is interesting to many from a purely theoretical point of view, and the following device may be new to the subject. It is new to me, both as to its mechanism and its principle."



Four links, *ab*, and its equal, *cd*, *bc*, and its equal, *ad*, are joined together as in the figure, the points *a* and *b* being fixed. As the system is moved about the fixed centres, the intersection of the two crossed links will follow the outline of an ellipse, *fg*, which has its two centres for its focii, and the link *ad* for its major axis.

The figure shows the instrument in rough outline, to illustrate its principle only, but it is easy to see that it would be adjustable for different ellipses if the centres were mounted on sliders, or otherwise made moveable on the bars. It would also be a simple matter to attach a double slider that would slide on both the crossed bars and hold a pencil point at their intersection.

The Etheridge Gold Mines.

With reference to the answer of Mr. E. Stanhope to Sir Richard Temple's question respecting the reported discovery of a gold region of extraordinary richness near the Etheridge in Queensland, which we published last month, the Agent-General for Queensland, Mr. James F. Garrick, writes to the *Times* the following, the letter being accompanied by a map of the district in question :—

"It seems to me the information in an answer to such a question in the House of Commons, being of a limited character, is necessarily incomplete ; allow me, therefore, to supplement it by official information.

"Mr. Gold-Warden Samwell, in his report to the Government upon the Etheridge field under his charge, states that the estimated area is 9,760 square miles ; that many of the known reefs on this field yield from 1 to 6 ozs. of gold per ton of quartz, while some have yielded from 10 to 16 ozs., and one, the 'Susan,' has actually yielded for the last two years, on an average, from 10 to 25 ozs. of gold to the ton of quartz. The average yield of the field for 1885 was 2 ozs. 10 dwts. While it may be true that no official information has been received of the discovery of any new gold field near the Etheridge, yet within its immense area constant discoveries are made of new reefs, and Mr. Warden Samwell reports 'there are thousands of square miles of mineral wealth in this field yet untouched.'

"The Etheridge is only one of the many others of Queensland well-known gold fields, and if it has not been developed to the same extent as Charters Towers, Gympie, Ravenswood, and others, it is only because it has not yet been brought within our railway system.

"Mr. Samwell says the Etheridge country is suitable for Europeans : the climate is cool and healthy, and the valleys and alluvial flats are fertile. I send you a map of the district which I shall be obliged by your publishing with this letter.

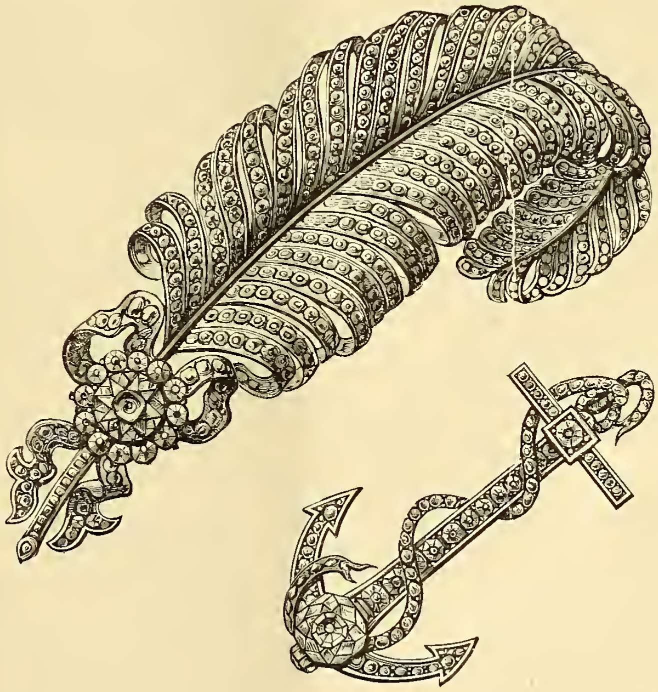
"Your article, besides dealing with the question of the Etheridge gold field, proceeds to make a comparison between the average yields of the De Kaap gold fields in South Africa and the Australian gold fields. I have already, I think, shown that the yield of the Etheridge field is greater than the De Kaap, while the average yield of all the gold fields of Queensland is known to be higher than that of any other country in the world. Queensland has willingly expended large sums in displaying to English capitalists and labourers her great mineral resources, as can be seen by her mineral exhibits and the quartz mill at the Colonial and Indian Exhibition. To those who are desirous of investing in mining pursuits and to the operative miner I can confidently recommend Queensland as a field for operations, where all the essentials for profitable investment and remunerative labour are to be found, with the special advantages—so far as the De Kaap gold field is concerned—of being within Her Majesty's dominions."

The Queen's Souvenir of the Colinderies.

It will be remembered that some little time ago, on the occasion of the Queen's visit to the Colinderies, at the show of the Natal Commission, a stone, found in the diamondiferous ground that was then washed, was selected by Her Majesty as a souvenir of the visit, Messrs. Ford & Wright, the well-known diamond cutters, who carried out the operations, being commissioned to cut and polish it and mount it in a suitable setting.

On visiting this firm's stand the other day, we were shown the brooch made up at Her Majesty's command, of which the stone in question forms the chief feature.

By the courtesy of Mr. A. Thorning, the designer, we are enabled to give illustrations of two of the sketches submitted to the Queen to select from, the latter of which was approved of, and the brooch made up accordingly.



The brooch is of silver, in the form of an anchor ; the body, cable and flukes are thickly set with small perfectly white Cape brilliants ; the stone is set between the flukes, and being a very fine yellow brilliant of about 3 carats, stands out in bold relief. Altogether, the brooch forms a very handsome ornament.

Indian Jewellery.

A VISIT TO A DELHI ZENANA.

By William Simpson, R.I., F.R.G.S., Hon. Assoc., R.I.B.A.

(Continued from page 91.)

HAVING now given the details of the jewellery worn by the zenana women in Delhi, I will add to this a couple of sketches and some account of the jewellery worn by a Hindu lady of Benares. I should say that there is not much difference between the style of the two which results from religion. The jewellers are generally Hindus, and each works in the style of his own locality: hence essential differences in work and design are more likely to be found in the widely separated districts of India than among the particular religions or castes. Still I think this Hindu lady's ornamentation will be found interesting, for although similar in style, yet the design presents differences which may be worth studying.

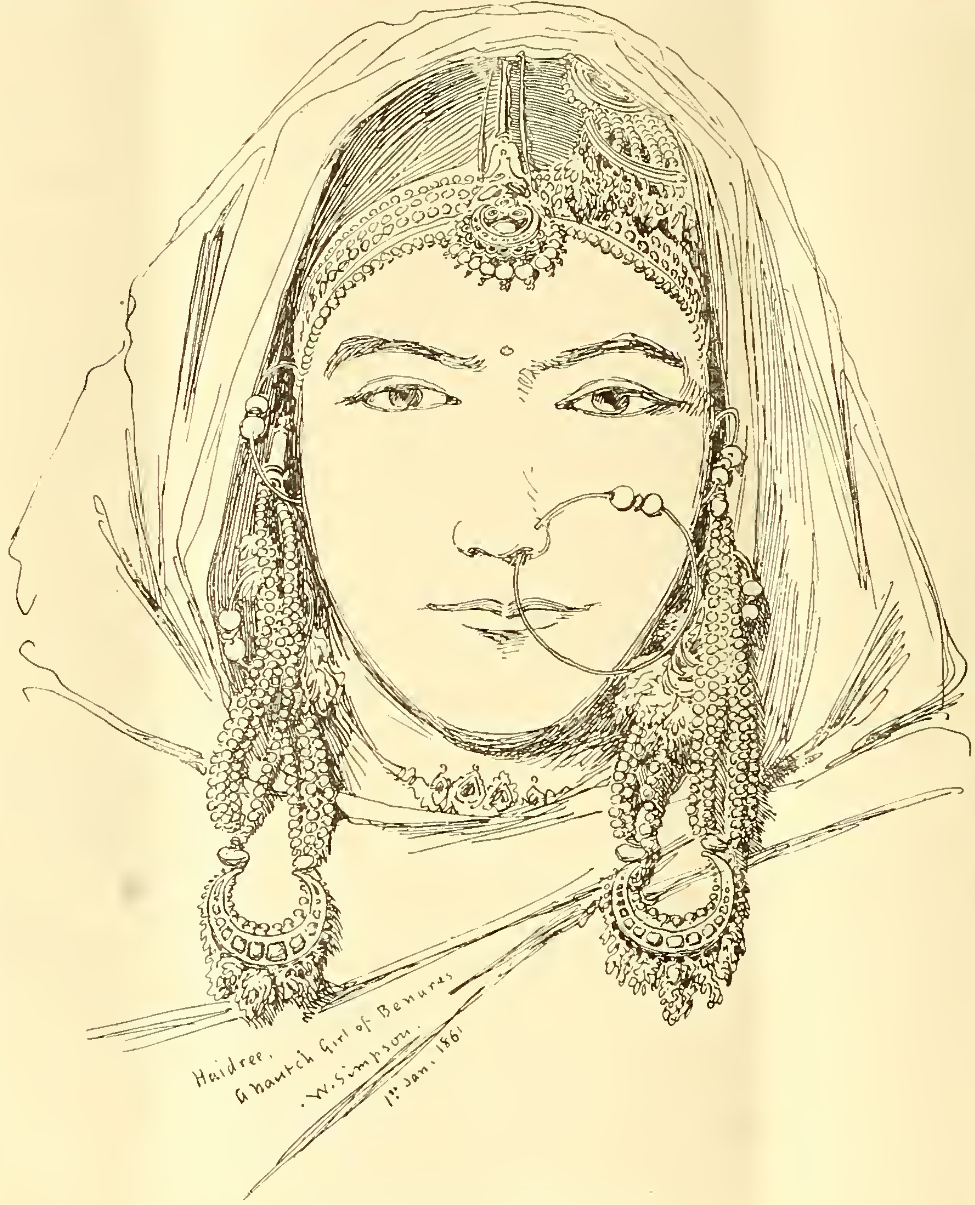


Fig. 8. Haidree, a Nautch Girl of Benares.

Having succeeded so well in Delhi in my desire to see and sketch the inner life of the Mohammedan capital of India, on reaching Benares, which is considered by the Hindus to be their religious metropolis—as a place of pilgrimage it is the Brahminical Meccah or Jerusalem—I felt anxious to realise an equal success in that city. While there I was lucky enough to be introduced to the Rajah Deo Narain Singh, a man who enjoyed a good reputation among the Europeans, and at his invitation I went one day to make sketches in his palace. While there I explained to some of his people my wishes, and asked if it was possible to make sketches of the inmates as well as of the palace itself. I had to be very careful as to the manner of putting it, as well as in the explanation of my objects, lest a mistaken intention should have been attributed to me. I was under the notion that the Hindus would not have the same strictness, which is all but a religious law among Musselmans. Here I found myself completely mistaken. We know that two thousand years ago the women of India did not hide their faces, but since the Mohammedan invasion of India all this has changed, and they have adopted the strict zenana system of the conquering race. Someone had communicated my wishes to the Rajah, and he most kindly sent off for a *Nautch girl, who came with all her finery on, as I suppose she had been ordered. Her name was Haidree (fig. 8), and, as I learned, she was one of the most noted in Benares. I was told she had at one time been a great favourite of Jung Bahadur's, the well known Prince of Nepaul. Judging by the jewellery she wore—a pretty safe test in India, where this is the banking process by which savings and money generally is invested—this lady must have been in a prosperous condition. Probably "the gems she wore" were presents from her numerous wealthy admirers, for I understood that Jung Bahadur was not the only one. I mention all this, because I take it that in this case I had as model a good specimen of a Hindu lady and her mode of ornamentation with jewellery; so I considered myself as being again fortunate in achieving what I desired. The only indication of her religion is seen in a small black spot on the forehead just between the eyebrows; this is the *tikal* or caste mark of her religion. The band that goes round the upper part of the forehead was formed of gold, with two rows of rubies, and bordered on each side with pearls. We find here again the crescent pendant on the middle of the brow, and attached, not in this case with pearls, but by means of a golden cord: the crescent was set with rubies, and had pearls as drops all round. The rubies in the crescent harmonised it with the brow-band, of which it seemed a part and a fitting central ornament. On the left side of the head were crescents and strings of pearls, to which a quantity of small emeralds and pearls were attached, evidently the same style of ornament as the Delhi Begum wore, only that it did not hang so far down.

The principal ornaments to the ears were strings of pearls, terminating in uncut emeralds, to which rather large crescents, set with rubies, were suspended; these hung down a good way below the level of the chin. The lady also wore two rings on each ear, one through the lower and the other in the upper part of it. These were of thin gold wire, and with the common arrangement of a couple of pearls and a small emerald between them upon each.

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* Nautch is from Nautchna, to dance.

The ring through the left side of the nose had on it two pearls and a small ruby between them. It will perhaps cause some surprise that such a very large ring is worn. Rings of this size are very common among all classes of women in India; I have repeatedly passed women out of doors with them, and always wondered if by a sudden jerk, should the ring get entangled in anything, that by such an accident were they ever torn away. One might suppose it would be scarcely possible to wear such a ring for any length of time without something of this kind taking place.

Haidree wore a number of necklaces, but my sketches of them are too slight to say of what they were composed.

Her wrists were covered with a large number of bracelets, some of pearls, gold chains, solid gold, and one was set with rubies. She had also a fair amount of rings on the fingers (fig. 9), but the arrangement on the back of her hand was still more elaborate than what I had seen in the Delhi zenana. There were the chains from the rings on the fore and little fingers, but chains also came from one of the bracelets, and to these was attached a jewel which lay on the back of the hand. This jewel moved about a little, but its position was supposed to be about the middle, and close to the knuckles. A jewel of this kind implied that the wearer was not accustomed to much work, and that all wants and necessities were performed by attendants. I had an indication of this while sketching. There was a door near where we were, and a light coming in from it rather disturbed the process of sketching. Instead of asking any of the servants, and there were a number of them about, to shut this door, I rose and did it myself. In doing this I had to move a pair of shoes which stood in the way. When I resumed the seat before my model I noticed there was a smile on her lips, and she was talking in her own language, which I scarcely comprehended at that time. I afterwards asked in English, of the person who brought me, and who could speak our language, what had tickled Haidree's fancy, when he explained that none but the lowest class of servants ever touched shoes, and she was surprised that a "Sahib" could condescend to do such a thing. Even shutting the door was an affair I ought to have given a "Hookum," or command to be done by an inferior.

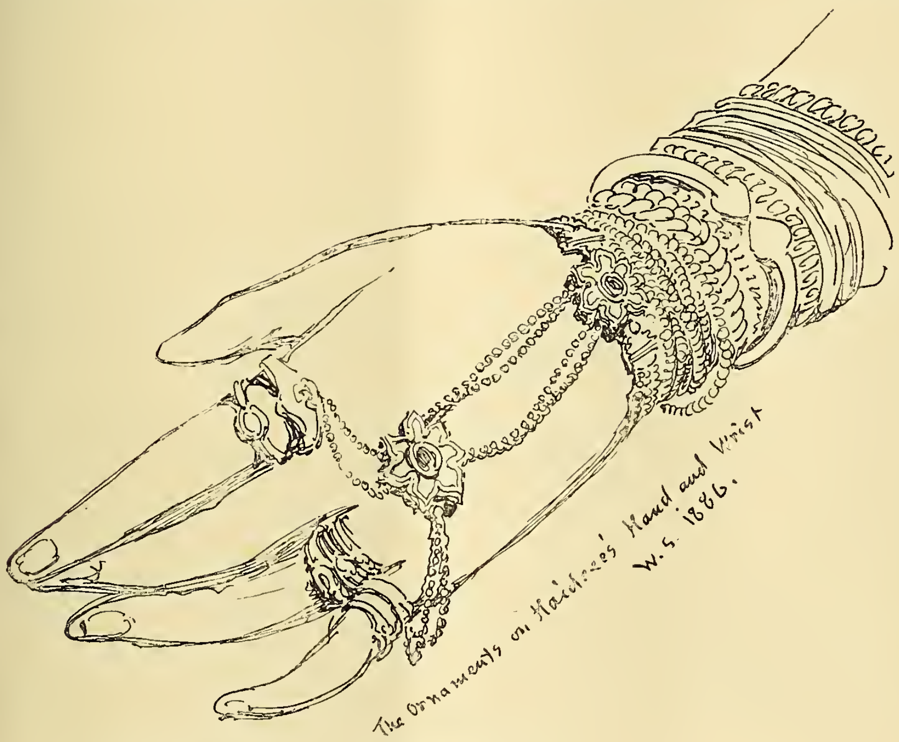
The Ornaments on Haidree's Hand and Wrist
W.S. 1886.

Fig. 9. The Ornaments on Haidree's Hand and Wrist.

William Simpson.

The History and Object of Jewellery.

By John Jones, F.R.G.S., &c.

(Continued from page 94.)

It may perhaps gratify the curious in archæology to give a translation of a poem on the foundation stones of the New Jerusalem as described in the Apocalypse. It is printed in a work by Marbodæus, *On the Stones of the Breastplate*, published about the year 1500.

The translation, though not professedly literal, gives, it is hoped, a sufficiently correct report of the author's meaning to suit the use of the general reader, and may perhaps obviate the necessity, in some instances, of disturbing the accumulated dust resting on Ainsworth :—

"Ye freemen of heaven, in unison sing
The praise of your founder. the all-ruling King,
While the stones of your city their radiance fling.
Of the Jasper.
In jasper's green, see faith's array,
Unfading through the wintry day,
Though Satan rave, unmoved her stay.
Of the Sapphire.
Blue sapphire, like the heavenly throne,
Shows suppliants girt with hope's firm zone,
Joying in noble deeds alone.
Of the Chalcedony.
Chalcedony, whose pallid flame
In silence gleams, but shrinks from fame,
Shows secret virtue's lofty aim.
Of the Emerald.
The emerald, of the olive green,
Is ripened faith's illuming sheen,
Which lights to duty's rugged scene.
Of the Sardonyx.
Sardonyx, in thy triple hue,
The lowly pure and brave we view,
E'en in the martyr's trials true.
Of the Sard.
The punic sard of bloody die,
Shows martyrs in their agony—
The crucifixion's mystery.
Of the Chrysolite.
The chrysolite, of golden blaze,
Betokens wisdom's sunny ways,
Where friends exchange the grateful gaze.
Of the Beryl.
The beryl, like the sparkling tide,
Denotes how genius loves to glide
Where self-created fancies guide.
Of the Topaz.
The costly topaz, hard to seek,
Like rosy blush on angel's cheek,
Doth contemplation's calm bespeak.
Of the Chrysoprase.
The Chrysoprase, with yellow light,
Still kindling most in blackest night,
Tells charity's unwearied might.
Of the Hyacinth.
Blue mixed with green the jacinth holds;
In changing hue the eye beholds
Angelic love in wisdom's folds.
Of the Amethyst.
The purple amethyst displays
In rosy flames and violet rays,
The heart that Christ for succour prays.
What mean these stones that priceless shine?
Their varied tints form virtue's crest.
Right is His heart where all combine.
Salem! on these thy temples rest;
Happy the soul who wins thy gate,
Sleepless is he that guards thy towers;
Grant us, O King, complete life's date,
To rest with Thee in heavenly bowers."

It is necessary to observe, that, from the want of the analytic knowledge of the elements of minerals, much confusion exists among the ancients in the names given to stones, different shades of colour of the same gem being called by different names. This and such errors as have arisen from ignorance even of this system, have created a large field of controversy among Biblical commentators. It is not particularly interesting to revive the discussion in this place; a suggestion however as to the false nomenclature of one or two of the above, may perhaps facilitate the exposition of his meaning, of whom it may be hoped that he is now realising the splendour of his vision.

The beryl is probably the aquamarine; the hyacinth most likely refers to the tourmaline, whose optical properties are so interesting a phenomenon.

Colours being the characteristics of gems, we see the propriety of pearls being used as parallels of Christ. St. Augustine explains the parable of the merchant selling all his pearls wherewith to buy one, as the Jews resigning the prophets for the superior claims of Christ, and in spite of an admitted objection to allegorising, there is throughout the fathers a continual acknowledgment of this symbolic meaning of pearls; no doubt can therefore exist but that colours held a significance which they have now lost; but, if further proof were wanting, it might be found in the universal belief in the power of precious stones over bodily and spiritual ills, which the Arab dynasty introduced into Europe.

Evax, King of the Arabs, wrote to the Emperor Nero a treatise on the habitat, quality and virtues of precious stones; and so widely had the conviction of their powers spread, that Boyle judged it must have foundation in truth; he accordingly made many experiments to determine the mode of their formation and composition: he described gems as being formed by filtration through the rock of their respective constituents in a state of solution into some cavity of the matrix rock, where crystallisation took place. As to their curative powers, he concluded that, as we did not fully know the nature of the human frame, it was not contrary to sound reason to accept universal testimony, though inexplicable. His book on the virtues of precious stones made much noise in the world, and passed through three editions, in a Latin translation, on the Continent. The constant tendency of symbols to be exalted into causes, supplies an easier solution of the wide-spread superstition. The following are some of the virtues attributed to stones, as borrowed from a Persian manuscript, translated by Raja Kalikishen, in the *East Indian Magazine*, in which the similarity between the virtues of the stones and the ideas which they originally represented will even now be traced:—Diamond preserves from lightning, cures madness and vain fears; ruby purifies the blood, quenches thirst, dispels melancholy, ensures honour and competence; the emerald averts bad dreams, gives courage, cures palsy; the turquoise, in its Persian name, "Aber Is'hagi" (Father of Isaac), contains reference to a mental principle particularly valuable, since at Nishapur, in Khorasan, is the only known turquoise mine in the world—it brightens the eye and is a remedy for the bites of venomous animals. And in other traditions it is maintained that pearls refresh the spirits and obviate passions; sapphire preserves from enchantments; chrysoprase will make one out of love with gold; agates preserve from tempests; amethyst prevents inebriation; corals change colour with the mind of the wearer.

One general condition belongs to all, viz., that by good men only can the beneficial influences be received.

The virtues of plants were attributed to the operations of nature, but a special divinity was thought to emanate from stones.

Though the revival of such belief seems inconsistent with the advance in learning, which closer observation of natural laws has effected, yet it is not beneath the notice of philosophy to trace an error to its roots and explain its existence.

The language of flowers is familiar to all. In the harems of the Mohammedans it was brought to perfection. The secret correspondence of the captives was through the medium of colours.

> "In Eastern lands they talk in flowers,
> And tell in a garland their loves and cares;
> Each blossom that blooms in their garden bowers,
> On its leaves a mystic language bears."

Heraldry employs colours to signify character. For the revival of this higher principle in the use of jewellery, Europe is indebted to the Mohammedan conquerors of Spain.

The merchant princes of Venice maintained an intimate commerce with the East and Spain, and indulged their ambition with all the magnificence colours could supply. Glass was substituted for gems, and enamel for many centuries was introduced into all jewellery; Venetian enamel is still the most esteemed, for an art of producing colour is there known which other countries cannot equal. In the Geological Museum is an interesting specimen of early enamel, representing St. Paul, date about 1000. The blending of different colours in successive firings was not then known. During this symbolism the arts of design languished; King Alfred and Charlemagne endeavoured to revive them, but with the loss of their patronage they again drooped. The former sent to every cathedral a stylus in enamel, of the value of £20, together with a translation of St. Gregory's Pastoral. He hung bracelets of gold in the highway, as a proof of the strict scrutiny of the law and the good discipline of the people. His amulet in the Ashmolean Museum, Oxford, contains a figure of the Virgin in an enamelled border, enriched with scrolls in a formal, yet not inelegant, style of work. Charlemagne encouraged the use of jewels by money, example and design. He wore a crown of his own design. On state occasions he was dressed in a tunic interwoven with gold, and a mantle fastened by a gold brooch; his shoes were adorned with gems, his belt was of gold, and the hilt of his sword composed of gold and precious stones.

(To be continued.)

Reviews.

The Commercial Traveller's Guide. By J. Williams Roe.[*] This shilling volume, a revised edition of which has just been published, should prove a boon to all business men and others having occasion for travelling. It contains full information concerning the railway system, hotels, banks, market days, postal system, &c., of all the principal towns in England and Wales, and with its other items of interest forms a complete traveller's *vade mecum.*

The Watch and Clockmakers' Handbook, Dictionary and Guide. By F. J. Britten.[†] The sixth edition of this useful book has just been published in a considerably improved and augmented form. As stated in the author's preface, the whole of the fourth edition of the "Handbook," as well as much new matter, appears here under headings arranged alphabetically, with French and German equivalents, except the Date Marks on Watch Cases, Lengths of Pendulums, and other Tables required for constant reference, which now form an Appendix. Separate alphabetical lists are also given of the foreign equivalents. The work forms a complete guide to both the student and the workman, and must have entailed a large amount of labour and research. Mr. Britten is to be congratulated on having added another standard work to the ranks of horological literature, and we wish him the success he justly deserves.

The Story of the Invention of Steel Pens, with a Description of the Manufacturing Processes by which they are produced. By Henry Bore.[‡] In this interesting little pamphlet, the author says the names first associated with the manufacture of steel pens by mechanical means were John Mitchell, Joseph Gillott, and Josiah Mason, and, after ably discussing the various claims as to their original invention, attributes the increased public demand for the most indispensable auxiliaries of modern times to the successful speculations of Mr. James Perry, of London, which brought them within the reach of all classes. After a detailed description of the processes (including the marking, piercing, embossing, raising, grinding and slitting) of their manufacture, tracing them from the plain sheet steel to the complete pen, interesting statistics are given, from which we learn there are at present about twelve firms in Birmingham alone manufacturing steel pens, for which purpose they use up between them some twenty tons of steel per week, giving an average weekly production of 170,000 gross of pens. The work concludes with an Appendix containing a short history of the Perryian Pen Works, and is altogether well worth perusal.

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[*] J. W. Roe, 5, Wine Office Court, Fleet Street, E.C.

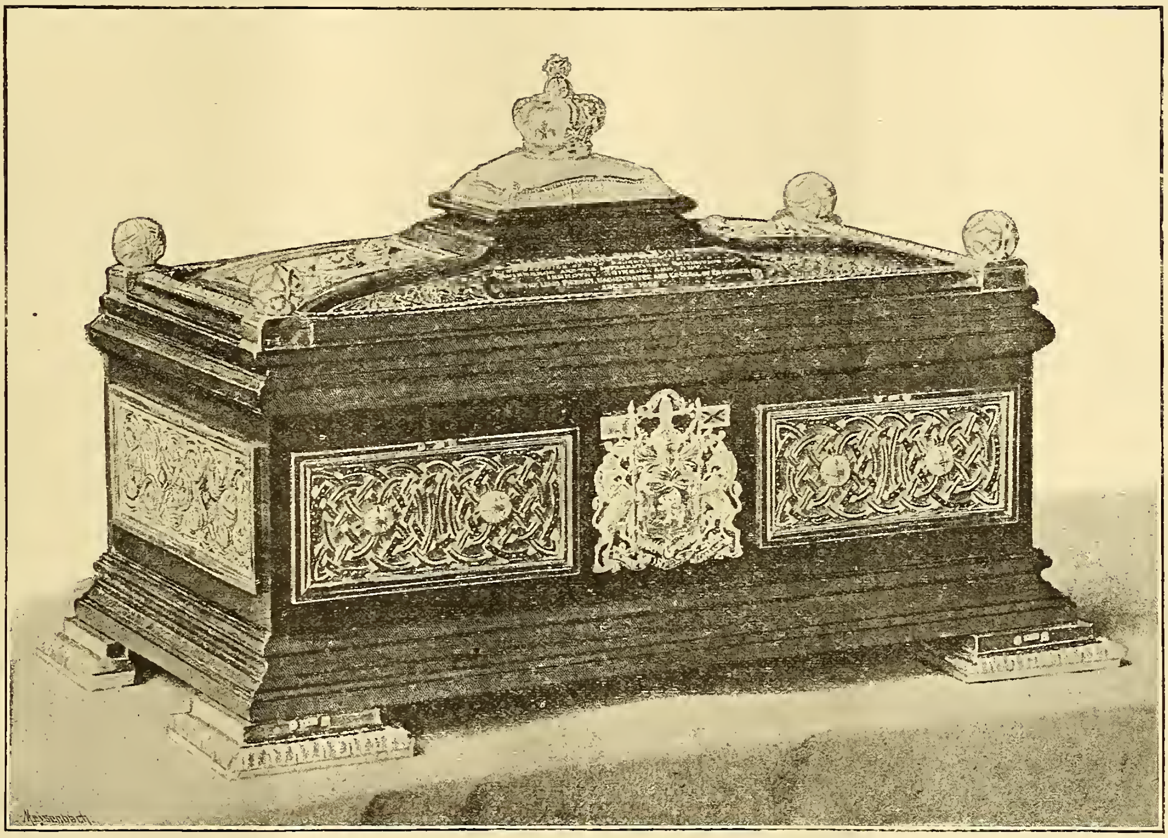
[†] London: W. Kent & Co., Paternoster Row. New York: E. & F. N. Spon, 35, Murray Street.

[‡] London: Perry & Co., Limited, Holborn Viaduct. Birmingham: Cornish Brothers, New Street.

The Edinburgh Corporation Casket presented to the Queen.

We have been favoured with an illustration of the casket, designed and made by Messrs. Marshall & Sons, George Street, Edinburgh, which was presented to the Queen, containing the address of the Corporation, on the occasion of Her Majesty's recent visit to Edinburgh. The body of the casket, which measures 12½ inches by 7 inches, is constructed of dark oak taken from the house of Mary of Guise on the Castle Hill. Standing on four silver feet, it is richly ornamented with silver plaques, elegantly chased with open Runic work on a background of gold. In the centre of the front is a representation of the Royal arms, while on the back the arms of the City of Edinburgh occupy a similar position.

The lid is raised and is edged with a Runic band having finals at each of the four corners, and is surmounted by a Royal crown in silver and resting on a frosted silver cushion. The interior of the casket is lined with crimson velvet, and the whole is enclosed in a case of blue leather richly gilded.



The Edinburgh Corporation Casket presented to the Queen.

Birmingham News.

From Our Correspondent.

Is it true, or are the political chiefs with their followers, who confidently predict a wave of commercial prosperity to the country, only trying to buoy up the drooping spirits of capitalists and other interested persons? There must be something in the reiterated statements that the tide is beginning to turn, and that already confidence is displayed by the unloosing of the strings which have so long held back the flow of money from empty cash boxes. The prophets predict a revival with so much boldness that I am almost compelled to believe them, and discard the cynicism with which I have unfortunately so long been accustomed to treat their reading of the signs of the times. I have carefully examined the reports of the various trade centres, and although there is an undoubted movement and increase in the production of goods, it is not of such a nature as to cause us to expect any immediate relief; it must be considerably augmented in extent and volume before we can expect in our own industries any material improvement. It goes without saying that we hope all departments of trade will not only maintain their present hopeful appearance, but continue day by day to improve; if they do, then the lessons taught by adversity will speedily be put into practice, and the whirr of machines long silent make glad by their sound the hearts of thousands now living in enforced idleness.

* * *

It has come to my ears that there are some unscrupulous manufacturers who are endeavouring to starve out their competitors by underselling—selling their manufactures without a margin of profit. It is hardly possible to conceive a more foolish or short-sighted policy, cruel, if such a word may be used in reference to trade, in its effects upon workmen and masters alike. Is it likely that shopkeepers and the public will submit, when their demand increases, to any great advance in selling prices, and will they not be strongly tempted to encourage a still further importation of goods which are already finding such general acceptance? Birmingham workmen will not work for a mere pittance, materials cannot go lower, and the quality of our productions by which only we live, will deteriorate until we offer English goods at English prices, but in quality equal only to foreign. I do not object to manufacturers selling *any* goods at as low a rate as they can *afford*, but to go beyond this seems to me to be destructive to the best interests of trade, and will, I sincerely hope, bring its sure punishment only upon the heads of its originators.

* * *

I am told by some of the exhibitors at the Industries Exhibition that they have derived much good from it, and have already cleared their heavy expenses; on the other hand, there are some who are losers to a considerable extent. I think the cost, in some cases very large, should not be altogether borne by exhibitors, but that a moiety at any rate should be paid out of the balance left in the treasurer's hands. In a pecuniary sense, not to mention other advantages, the Exhibition is said to be a great success.

WATCHMAKERS are still in the depths; no stir in the market beyond a few inquiries, and a disposition amongst large buyers to obtain still further reductions. Shopkeepers report that they are overburdened with stock, which in this particular is, we fear, mostly of American make, and upon which they can only make a very fine profit: English levers bear a much greater percentage, but are held back, whilst the cheap articles are prominently placed before the public.

* * *

MESSRS. BLANCKENSEE & SON are in a fair way to become renowned for the manufacture of special work in jewellery; they have recently carried off the honours at Leicester, and now are engaged upon a casket which has been publicly subscribed for and is to be presented to Sir William Armstrong, at Newcastle-on-Tyne. The casket is made up in 18 carat gold and oak, and has engraved upon it, in addition to the City arms and various views, Sir William Armstrong's crest and coat of arms. This work of art will be presented to Sir William on the 1st or 2nd of November, and I hope to be able to give your readers a full description in your next issue. In addition to the above, Messrs. Blanckensee & Son have just made a very handsome silver gilt key, which was presented to the Mayor of Cheltenham on the occasion of his opening some new water-works in the neighbourhood of the town.

* * *

DIES have been prepared by several leading houses, who purpose making large quantities of Jubilee brooches, &c. It is expected that the sale of brooches, &c., bearing well-executed heads of Her Majesty, will be enormous, although I think they will be mostly of a cheap description.

* * *

THE old firm of Messrs. G. E. Walton & Co., Hylton Street, is now extinct; the business has been turned into a limited Company, and whilst retaining the old staff, there are alterations which cannot but prove advantageous. There is every reason to believe that there will be a large increase of business.

APPLICATIONS FOR LETTERS PATENT.

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, and 6, Lord Street, Liverpool.

12,020. John Compton Weeks Jeffreys, London, for "Improvements in studs and solitaires and such like articles." Dated 21st September, 1886.

12,122. John Masters, London, for "Improvements in scratch brushes for the use of jewellers and others." Dated 23rd September, 1886.

12,124. Alexander Melville Clark, a communication from Victor Alfred Pilload, France, for "An improved pneumatic clock."

12,172. Frederick Arthur Walton, London, for "Improvements in the fastenings of bangle bracelets." Dated 24th September, 1886.

12,219. Herbert Dalgety, London, for "Improvements in joints and tongues for brooches and such like articles." Dated 25th September, 1886.

12,272. Edwin Barron Harrop, London, for "Flower holders, attachable to and detachable from brooches." Dated 27th September, 1886.

12,295. George Joseph Atkins, London, for "New or improved means and apparatus for the separation of gold and other metals from their ores." Dated 28th September, 1886.

12,428. Edward Russell Cummins, a communication from George Ph. Schweder, Portugal, for "Improved process for extracting gold and antimony-regulus from auriferous antimony ore." Dated 30th September, 1886.

12,439. Henry Matthew Robottom, Shustoke, for "An improved method of manufacturing keyless watches." Dated 1st October, 1886.

12,469. Robert Brown, London, for "A novel tool for gauging and fitting brooch pins." Dated 1st October, 1886.

12,491. Victor Reclus, London, for "Improvements in electric clocks." Dated 1st October, 1886.

12,659. Frank Leman, 323, High Holborn, London, for "Improvements in the art of manufacturing watches and other mechanisms." (Complete spécification.) Dated 5th October, 1886.

12,840. Charles Ernest Hoefling, London, for "Improvements in apparatus for synchronising clocks." Dated 8th October, 1886.

12,876. Joseph Cook, Birmingham, for "Improvements in jewellery." Dated 9th October, 1886.

12,927. Louis Charles Dettmer, London, for "Improvements in and relating to snaps and catches for jewellery, &c." Dated 11th October, 1886.

12,957. Alfred Martin, Birmingham, for "Improvements in or additions to watch keys, charms, trinkets and other articles of jewellery." Dated 12th October, 1886.

13,017. Louis Edwin Broadbent, London, for "A new or improved link-piece and safety clutch serving as 'protector' and attachment for chains and watches, articles of jewellery, keys and such like, worn in the pocket." Dated 12th October, 1886.

13,107. Augustus Philip Bethell, Auerley, for "Improvements in or appertaining to buttons, studs and similar articles." Dated 14th October, 1886.

13,110. Montagu Davis, Birmingham, for "Improvements in the fastenings of bracelets, applicable to other similar purposes." Dated 14th October, 1886.

13,119. Edmond Chatelain, a communication from Edouard Keller and Fritz Gruring Dutoit, Switzerland, for "The manufacture of watch case bands by machinery." Dated 14th October, 1886.

13,185. Gustavus Baron de Overbeck, London, for "Improvements in the manufacture of aluminium." Dated 15th October, 1886.

13,267. Joseph Robinson, London, for "Improvements in the construction of keyless watches." Dated 18th October, 1886.

Correspondence.

All Letters for Publication to be addressed to the EDITOR *of* THE WATCHMAKER, JEWELLER AND SILVERSMITH, *Imperial Buildings, Ludgate Circus, E.C.*

All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.

TO THE EDITOR OF *The Watchmaker, Jeweller and Silversmith.*

DEAR SIR,—I should be glad if any of your correspondents can tell me why the oil perishes so quickly in the cylinders of Geneva watches, and whether there is any remedy without making a cylinder. I find it does not do so in cylinders of my own make. It does not seem to make much difference whether the watch is a low or high priced one; in fact, I think of the two the higher priced one is the worst, so much so, that I shall not put any more in stock. An answer in your journal will oblige.

"HOROLOGIST."

[There is no reason why oil should coagulate in or run away from a Swiss-made cylinder more quickly than with an English-made one, provided the former is of correct proportions as to height, is correctly worked in, and that the opening cut away to allow the escape tooth to pass is sufficiently wide; and, considering the small cost of a cylinder ready for pivoting, we should think making cylinders here was very little practised. That the price of a watch should have any influence on the oil in the cylinder, is mere fancy. The manner of cleaning watches lately introduced, viz., dipping the various parts in benzine (not always very clean), which at the best only absorbs the oil, leaving all the previous concretions to mix up with the fresh oil when added, is likely to have more to do both with the thickening of the oil and the cutting of the cylinders than anything else.—ED.]

"ANXIOUS" writes:—Would any of your readers explain through your paper the process for gilding watch wheels? If any kind reader would overcome my difficulties in this matter by explaining through your columns he would greatly oblige.

Buyers' Guide.

The Sheffield Smelting Company, Sheffield, *Sell* Gold and Silver (pure and alloyed). *Buy* all materials containing Gold and Silver.

F. W. Powell, Jeweller and Silversmith (Manufacturing), 23, Great Sutton Street, Clerkenwell, E.C. Wholesale only for Gold and Silver Jewellery; Silver Cigar, Cigarette and Card Cases, Match Boxes, Salt Cellars; Silver and Glass Smelling Bottles; Sovereign Purses.

WANTED.

TO WATCHMAKERS and JEWELLERS.—WANTED TO PURCHASE, a BUSINESS, one with a good Watch Jobbing Trade preferred. Apply by letter — WATCHMAKER, care of Wm. F. Needham, 52, Barford Street, Birmingham.—[ADVT.]

AN EXHIBITION of DRAWINGS by the Students of the TECHNICAL DRAWING SCHOOL, established by the Goldsmiths' Company, at 157, Goswell Road, takes place on 15th and 16th November next, from 1 to 9 o'clock—Entrance Free—to which the Public and Trade are respectfully invited. CHARLES MEYER.—[ADVT.]

The

Watchmaker, Jeweller and Silversmith.

Edited by D. GLASGOW, Jun.

Entered at Stationers' Hall.] [*Registered for Transmission Abroad.*

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The Watchmaker, Jeweller and Silversmith.

A Monthly Journal devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

Subscription.—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

Advertisements.—The rates for advertising will be sent on application. THE WATCHMAKER, JEWELLER AND SILVERSMITH will be found an exceptional medium for advertising. Special Notices, Situations, &c., per insertion, 1s. for two lines, prepaid.

Correspondence.—Correspondence is invited on all matters of interest to the trade. Correspondents will please give their full address in each communication, not necessarily for publication, but as a guarantee of good faith.

Address all business communications to

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IMPERIAL BUILDINGS, LUDGATE CIRCUS, LONDON. E.C.
Cheques and Postal Orders to be crossed and made payable to J. TRUSLOVE.

AGENT FOR THE AUSTRALIAN COLONIES:
EVAN JONES,
Hunter Street and Royal Arcade, Sydney, N.S.W.

Editorial.

THE meeting of the Prescot Watchmakers' Association held last month, a report of which is given on another page, is another instance of the want of harmony prevailing among different sections of the watch trade on the question of preventing unfair foreign competition.

That the depression of the English trade is largely due to the law which permits of the Hall-marking of foreign-made cases there can be no doubt, and there is every reason to believe that, were the law altered in this respect, the trade as a whole would be benefited thereby.

What may be termed the original meeting of the present agitation, held in Clerkenwell in September, and reported in our October issue, kept this point fairly in view, and, for an assemblage in which so many conflicting elements were gathered together, may be said to have been tolerably unanimous on the subject.

But that the resolutions adopted, although pointing out the grievance, did not at the same time show a definite course to be pursued in order to remedy it, is a clear indication of the difficulty of solving the problem under consideration. Further indications seem to show that members of separate branches of the trade desire to be protected so far as their particular branch is concerned, without any consideration for the remainder, while some go so far as to advocate absolute protection. The latter policy is absolutely untenable at the present day, and the former selfish views are much to be deplored. All united action is thereby prevented, and whatever chance there may be of succeeding in the main object is entirely spoilt.

A plain issue is now before us, and it rests only with the members of the trade to bring it to a successful termination by united action on that issue. The general promulgation of such views as those enunciated in some of the speeches delivered at the Prescot meeting would do much towards hindering the desired result.

With the conviction of the five gentlemen last arraigned, the trial for the great diamond robbery from Mr. Tabak came to a most satisfactory conclusion on November 4. It was with the aid of the evidence of the first convict, Toussaint, of ominous alias, that the desirable result was accomplished, and all the members of this enterprising gang are now, for a time at all events, being taken care of, which cannot but afford relief to those interested in their safe custody. Mr. Tabak has testified this, on his part, by publicly thanking the members of the police force and others engaged in the caption. The moral such cases point is one the events of the last few years show to have been too seldom attended to. The readiness with which those with a seemingly over-anxiety to do business part with valuable goods of all kinds, and the fatuous indifference they display with regard to references, is simply marvellous.

Although the trial above referred to has now become matter for ancient history, it will doubtlessly have its uses for a time in making dealers more careful, until, perhaps, as history repeats itself, an immunity from outrages of this sort lulls them again to the confiding state of repose that shall excite the cupidity of other men of the prisoners' type and industry.

General Notes.

Mr. LOUIS FAGAN, of the British Museum, will in January next deliver at Rugby School his series of five popular lectures on the art of metal and wood engraving. Each lecture will be illustrated, by means of the lime-light, with 40 reproductions of choice prints projected upon a screen and much enlarged.

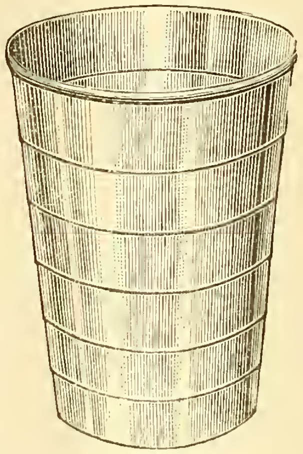
A watch has just been patented in the United States by Mr. Domingo T. Garcia, of Guadalajara, Mexico, which is described as having two crown wheels mounted on an arbor in the case, one of the wheels having more teeth than the other, a pinion engaging the teeth of both crown wheels, with a crown escape wheel on its shaft and with other novel features, making a watch with very few parts and designed to be very accurate.

A clock has likewise been patented by the same inventor, whose construction is based upon the principle of differential gearing. It has but few parts, two toothed wheels being mounted on the same shaft, one fixed and the other loose, an escapement anchor pallet engaging with both wheels. The loose escapement wheel has part of its face cut out and a circular scale formed around the opening, with other novel features, the use of the usual multiplying train being dispensed with.

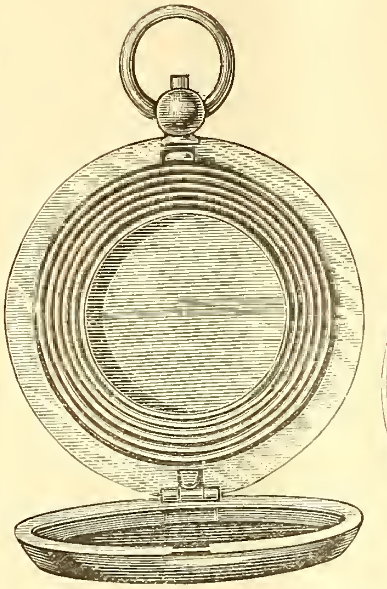
Mr. James Rigg, of 11, Queen Victoria Street, E.C., has just issued a new and revised edition of his illustrated catalogue of Drawing Appliances, Models, and Apparatus for Technical Instruction, &c., which is to be strongly commended to all lecturers in science and technical class teachers. The illustrations —of which there are some 300—represent models of various machinery and apparatus used in all sections of mechanics, the subjects to which they relate embracing, among others :—Theoretical and Applied Mechanics, Plane and Solid Geometry, Machine Construction and Drawing, Mining and Metallurgy, &c. The models illustrating Professor Willis's "Principles of Mechanism" include cam and wheel actions of all kinds, and would form a valuable addition to horological schools where they have not already been adopted.

The Society of Arts' Cantor Lectures. *Friction.*—The series of lectures on friction, delivered by Professor H. S. Hele Shaw in January and February, have been recently published in the Society's Journal. The subject is minutely and exhaustively treated in four excellent lectures, the two first of which deal successively with the first laws of friction of solids and liquids, while the remaining two relate to its mechanical application and the methods of reducing its resistance, respectively, every conceivable contrivance illustrative of attempts in the last direction being described (from escape wheel pivots for watches to roller bearings for cycles). All the papers are written in an easy readable style that makes their perusal at once pleasurable and instructive. The series should be in the hands of every mechanic.

The new portable form of drinking cup for tourists and travellers, invented by Messrs. Timings and Son, of Birmingham, which we noticed in our August issue, is having a large sale, and it seems certain will come generally into favour with the travelling public. The obvious utility of an arrangement that does away with the necessity for carrying an extra loose glass or vessel—always in danger of being broken and usually at great inconvenience—added to its moderate cost, are sufficient to ensure the success of this useful invention. By favour of the manufacturers we are enabled to give an illustration of the cup and its case.



CUP EXTENDED.



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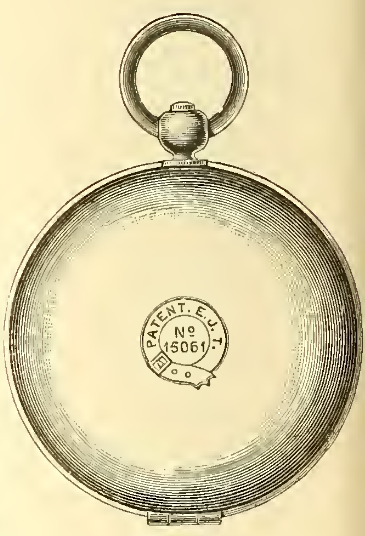

CLOSED.

Captain F. T. Penton, M.P. for Central Finsbury and Honorary President of the London Watchmakers' Association, has presented a donation of £105 towards the funds of the organisation.

The Exhibition of Drawings by the students of the Technical Drawing School, established by the Goldsmiths' Co. at 157, Goswell Road, E.C., announced in our last issue, took place on the 15th and 16th ult., and was, so far as the work shown is concerned, a decided success, although the numbers visiting it were small. The exhibition comprised specimens of all kinds of designs in monograms, heraldic and goldsmiths and jewellers' work. Mr. Meyer is to be congratulated on the great advance shown by many of his pupils, some of whom exhibit very considerable talent, both as draughtsmen and originators. Among the prize takers are: C. Duffy, A. Hardiman, D. Humphrys, C. Fairhead, A. Morgan, W. Berks, T. Marsh, W. Hilton, W. Gibbon and F. Henley.

A report is current that the Astronomer-Royal meditates retiring on a full pension at the end of the present year, and that the vacant post will be offered to Mr. Norman Lockyer, on account of the services he rendered in connection with the recent eclipse expedition.

Messrs. Elkington & Co. have been awarded a gold medal for their exhibit at the Birmingham Exhibition, special mention being made of excellence in *répousse* work.

Messrs. Stauffer, Son & Co. have removed from 12, Old Jewry Chambers, to 13, Charterhouse Street, Holborn Viaduct.

Sir John Lubbock's Shop Hours Regulation Act came into force on the 1st ult. The measure, which is to a certain extent experimental, applies only to such young persons under eighteen as are not members of the employer's family, and limits the hours of labour to 74 per week, including meal times. It is intended as a supplement to the Factory Act for the protection of young employés; but the general opinion is that the difficulties of efficient inspection and of securing convictions will be so great as to render it ineffective.

In view of the great benefits derived from the Colonial and Indian Exhibition, and the friendly intercourse it has promoted, both between the Colonists themselves and with the people of Great Britain, Mr. Ira Cornwall, Commissioner for New Brunswick, suggests that the "Colinderies" should be followed by a series of exhibitions to be held in each of the Colonies and in India. These exhibitions he would throw open only to exhibitors from Great Britain and her dependencies. As the position of Canada entitles her to make the commencement, proposals are now taking shape with the idea of holding such an exhibition at St. John, New Brunswick, during the year 1888. St. John is most admirably situated for this purpose, being accessible by sea at all seasons, as well as having great facilities for shipment of goods from all parts of Canada. The completion of the short line of railway from Montreal here, which will soon be finished, will make it the winter terminus of the Canadian-Pacific Railway.

Earrings.—Dr. Morin, in his work on the hygienics of beauty, makes a dead set against earrings. In numbers of cases he has known erysipelas proceed from their use. The idea that they are good for weak eyes he quite disposes of. It is possible, he says, that in cases of inflamed eyes they might act as a counter-irritant, but, if they did, they would make the lobe of the ear—which, not being rich in blood vessels, has little recuperative vitality—in a state of permanent ulceration. There is no surer test of a good or bad constitution than the state of an ear which has been pierced and exposed to the irritation of heavy earrings. If the lobes keep red and swollen, they proclaim bad blood and scrofulous tendencies.

In an article apparently called forth by the recent investigations in Paris as to the composition of artificial rubies, a writer in *Chambers's Journal* says the so-called "Scottish Jewellery," made from cairngorms, cinnamon stone, &c., is largely manufactured in Germany, where most of the stones required are quite plentiful. It is common enough to impose the cairngorm on ignorant purchasers as Brazilian or Mexican topaz. Edinburgh lapidaries are able to prepare and mount the cairngorm and pebbles of Scotland with taste and skill. Crystals of smoky quartz are found in every part of the globe, and can be so skilfully dealt with by lapidaries and experts as to be made deeper or lighter in colour as may be demanded. Each manipulator is of course careful to preserve his particular mode of procedure secret from his fellows; and some of them are very clever in their various manipulations of Scottish stones, which can be set with fine effect in brooches, snuff mulls, dirks and powder horns.

Artificial Flowers.—It is usual to state that the making of artificial flowers arose in Italy, in the beginning of the eighteenth century. The modern trade certainly had such an origin, but, as a matter of fact, artificial flowers date very much further back. The Egyptians made them of thin plates of horn variously stained, and the Romans also were very skilful in imitating natural blooms in wax. Leaves plated with gold or silver, or made from plates of those metals, were also known to both these nations. The first artificial flowers of modern manufacture were made from slips of ribbon mounted on wire stems, but they were very unskilful and unsuccessful in representing nature. Afterwards feathers were used with much more fidelity of treatment. This may have been suggested by the knowledge that the natives of South America have from a very remote period used the feathers of humming birds and other tropical birds in making flowers. The early discoverers of that region speak of the skill of the savages in this particular; and in this they have the advantage of a wide variety as well as greater brilliancy and permanence of colour. Dyed feathers, when used in flower making are, by reason of the exposure to the sun's rays, to which they are necessarily subjected, apt to fade. But even the most successful feather flowers would appear tawdry and unreal by the side of the beautiful productions of the present day, when this branch of industry may well be believed to have reached a point beyond which further progress is impossible. The most diverse materials have been employed in their fabrication. The Chinese are exceptionally skilled in making flowers from rice paper and slices cut from the pith of a plant of the Aralia family; and the manufacture is carried on in the open street in Pekin. "Stretching along the narrow street for more than half-a-mile is a grand exposition of pith paper and silk flowers. Foreigners stand fascinated before the stands, watching the skill of the flower makers. Each one is provided with an assortment of pincers, some wire, a pot of glue, knives, and with pith papers of many hues. In a short time, while his deft fingers move with bewildering rapidity, he will counterfeit the dahlia, aster, rose, or whatever real flower lies before him for a model. His skill in cutting leaf, calyx and petal is equalled only by his marvellous eye for delicate differences of tint. Here the pedlar gets his supplies for the day. It is astonishing to see how fond the people are of these beautiful counterfeits of nature. The Chinese women wear no bonnets or hats, but do their hair up in elaborate fashion and wear flowers instead. In some parts of the kingdom you may know if a woman be a maid, widow or matron, by the colour of the flowers she wears in her hair." Among the other materials now or at previous times used in making flowers are thin sheets of whalebone, shells, hair, glass (blown and spun), silk cocoons, muslin, taffeta, velvet, satin, mother-o'-pearl, beads, coffee, chocolate, soap, marble, wood, brass, precious stones, wings of insects, porcelain, and common earthenware. At one time, flowers of porcelain, scented with perfumes to imitate the natural model, were very much worn. Many of these materials have only been used for the sake of novelty, and for the purpose of being shown in the Exhibition of 1851, when flowers were on view variously made in France, Austria, Portugal, Hamburg, Sweden, Madeira, Mexico, the Channel Islands, and the British Colonies.—*Drapers' Dictionary.*

Counterfeit Diamonds.—It is said that the manufacture of spurious diamonds, of the kind known as "doublets," is exceedingly ancient. The method of manufacturing them, practised by the celebrated Zocolino, was to procure a thin flake of an inferior stone, with as little colour as possible. As a bottom for the artificial gem he took a bit of crystal, and covered it with a transparent glue, in which was mixed the colouring material necessary to imitate the finest specimen. Upon this basis he superimposed the flake of cheap diamond, and so artfully concealed the joining of the two that even the cleverest lapidaries were deceived. The Singalese are experts in such frauds, which, in many cases, especially when both parts are really diamonds, are very difficult to detect. Frequently a cluster of diamonds will contain several doublets, and in necklaces are often found 20 per cent. of such questionable stones. Doublets are sometimes so artistically made that only the test of specific gravity will show that they are false. To buy diamonds, therefore, of irresponsible persons, particularly when they are offered at a temptingly low price, would be the height of folly, since the chances are that spurious stones would be palmed off on the unwary.—*Iron.*

The Geodetic Conference.—The International Geodetic Conference, assembled at Berlin, concluded its labours on the 1st ult. The next sitting of the Permanent Committee is announced to take place in 1887, at Nice. England was not represented, but she is expected to participate at the next session.

Paris Exhibition of 1889.—M. Lockroy, in opening the sittings of the 1889 Exhibition Commission, stated that the guarantee fund, fixed at 18,000,000 fcs., had already reached 22,000,000 fcs., the subscribers including both great capitalists and small tradesmen or artisans. All classes had felt that the Exhibition was a patriotic enterprise, which would show the world what the French really were—namely, an energetic, industrious, commercial and scientific nation, which chance defeats had not enfeebled or struck down. In 1867 the guarantee fund amounted to only 8,000,000 fcs. M. Lockroy spoke of the co-operation offered, as also of the "latent treacheries," unjustifiable ill-will, and unexpected jealousies which had been encountered. He complimented the Paris Municipality on having increased its ordinary subsidy of 6,000,000 fcs. to 8,000,000 fcs. He exhorted the Commission to lose no time, and not to allow the enthusiasm to cool. France, he said, looked for great results from the Exhibition, regarding it as a demonstration which would display her power, and as a pacific victory restoring to her her rank in the world.

The French Senate, by a large majority, have voted the sale of such of the Crown jewels as have not an artistic value. Those not sold are to be kept for the museums. Both Imperial Crowns are to be broken up and sold. Among the stones kept will probably be the famous "Regent," "Sancy," and the Mazarin diamonds, as being invested with great historic interest. While the jewels belonging to the earlier monarchs are mostly to be retained, the whole of the jewels and foreign decorations of the later ones are to be disposed of.

According to Dr. Percy, who presided at the recent meeting of the Iron and Steel Institute, the cost of manufacture of gold chains has sunk from 30s. to 3s. 6d. It would be interesting to jewellers to learn how long a time it has taken to make this startling development in their manufacture.

The International Exhibition of Art, Science and Industry at Saltaire will be opened on May 3 next.

The Colonial and Indian Exhibition.—The Press Association learns that it has been practically decided not to reopen next year the Colonial and Indian Exhibition at South Kensington. It is understood that the Royal Commission of the Exhibition of 1851 is about to hand over to the Jubilee Imperial Institute Commission the grounds at South Kensington, as its contribution towards the new Institute.

The American Exhibition, 1887.—According to a contemporary, the project for holding next year in London an Exhibition exclusively devoted to the display of the arts, inventions, manufactures, products and resources of the United States, may be said to be now fairly launched. All the necessary documents relating to the lease of the ground and the erection of the buildings have, we understand, been duly signed, and the work will be forthwith put in hand. Already the available exhibition space has been applied for three times over, and the task will now be to sift out these applications and allot as circumstances and the object of the undertaking will best dictate. The Exhibition will be situate at Earl's Court, West Kensington, and such is the accessibility of the spot by railway, that it is said a man might travel from one part of the kingdom and reach the interior of the buildings without being under the necessity of putting his umbrella up. Having regard to all the circumstances, quite apart from the fact that that which Americans take in hand is almost invariably carried out with marked thoroughness and determination, it is impossible to doubt the success of the project, which we may add has our best wishes for a satisfactory run.

The Colonial and Indian Exhibition was closed on the 10th ult. without any ceremony, excepting a dinner, at which the Executive Commissioners were entertained by the Secretary of State for the Colonies, the Right Hon. E. Stanhope, M.P.

We are pleased to inform our readers that Messrs. Kelly & Co. are again compiling, for early publication, their Watch and Clock, Jewellery and Fancy Trades Directory, embracing the whole of England, Scotland and Wales. The want of a reliable directory has long been felt among the trades concerned, and the appearance of the above publication will be hailed with satisfaction by many. Subscriptions or advertisements for the work may be sent to the office of this journal, Imperial Buildings, Ludgate Circus, E.C., addressed to Mr. A. J. Nightingale, from whom all further information respecting it can be obtained.

The Diamond Market.—The latest *Kimberley* advices state all classes of goods to be in strong demand, the prices being well maintained, with a slight upward tendency. At *Amsterdam* the workers are all fully employed, but are dissatisfied with the high prices ruling for rough stones, which leave but a small margin of profit on the cut goods at the present rates. The *Paris* dealers are doing a brisk business in cut goods with English and American buyers, and are hopeful of a change which will enable them to realise larger profits. *London.*—The steamers "Grantully Castle," "Moor" and "Trojan," arrived during the month at Plymouth, but, although bringing large parcels, the prices were steadily maintained, owing to the high quotations from the fields. Numerous foreign buyers attended, and a large quantity of small stuff was disposed of.

Silver.—The market price of silver has risen to 47d. per oz., at which price it remains, nominally only, however, there being little or no business done, and there is every reason to believe a considerable fall will shortly take place.

American Items.

FROM American contemporaries we learn:—The Mermod & Jaccard Jewellery Co. has on exhibition in their show-window a beautiful trophy won by the De Molay Commandery, of Louisville, at the last Triennial Conclave at San Francisco. It is pronounced to be the finest piece of workmanship ever seen in this city (New York). The body of the trophy consists of a solid mass of silver in the form of a vase, $11\frac{1}{2}$ inches in height and 24 inches in circumference, having on each side a handle of massive silver surmounted by gold, each handle containing eighteen separate compartments of gold quartz and silver specimens, in polished slabs. The handles protruding from the side of the vase make a total width of 13 inches. On one of the handles is a group of battle implements, consisting of two shields, in the centre of which are Knights Templar crosses, the whole made of gold and silver. Between the shields and crossing each other are a battle-axe and sword. On the top of the other are a helmet, lance and gauntlets, likewise of gold and silver. On one side of the vase is an emblem of the coat of arms of the State of California. On the reverse side is an emblem of the coat of arms of the Grand Commandery of California. Both of these are finely enamelled and are remarkable pieces of workmanship. The cover of the vase is a cylindrical mineral cabinet containing granulated particles of various specimens taken from Californian mines, numbering twenty-six classified compartments in all. These particles are so fastened as to prevent them from pulverising, the crystal covering under which they lie being opaque. On the top of this cylinder is the figure of a Knight Templar on horseback, made of gold and silver, both horse and Templar being in complete armour. The vase rests on two horns or cornucopia of gold and silver, the one containing the vinicultural and agricultural products of the State of California, the other containing gold quartz. On the front of the vase, and resting on a circular plate, is a miner (of gold and silver, 5½ inches in height) examining a quartz specimen. On the reverse side is a farmer resting on his plough. The horns, miner and farmer are placed on a circular plate 11 inches in diameter and 1½ inches in height, on the flat side of which are represented eight cabinet designs of Knights Templar crosses, and between these slabs of gold, quartz, &c. The bottom of this circular plate, which forms the foundation of the trophy, rests on four bears' feet.

Mr. E. R. Stockwell recently finished three trophies for the Shattemuc Canoe Club which have attracted much attention. The central portion of each shows a canoeist seated in his light craft, sails fully set, and all efforts bent towards winning the prize. The first trophy is round in shape, of gold and enamel, showing a silver rope, the club flag and appropriate lettering. The second is also made of gold, resembling in form a Maltese cross. Between the arms are shown two double paddles, upon which rests an enamelled flag, displaying the club's colours. The third prize is made of silver, and bears around the outer circle blue enamel lettering, the central portion showing a canoeist as above described.

A deposit of beryl, of the rare kind known as "golden beryl," has recently been found in Northern Connecticut. Specimens of this gem are occasionally met with in the hands of collectors, but it has rarely before been found in sufficient quantity to become an article of trade. When cut the stones are of a beautiful golden colour, exceedingly hard, and of great brilliancy. Mr. George F. Kunz, of Hoboken, N. J., pronounces them unsurpassed in purity and beauty. Professor Dana, of Yale College, who recently visited the mine, declares it to be a wonderful formation, and the crystals the finest ever seen by him. It is probable that the gems will soon be put on the market to be used in combination with diamonds.

The American *Manufacturing Jeweler* says:—"Taking the situation all in all, we have a good deal to be thankful for. Business could be much worse. When economy is necessary, it is begun in jewellery. When the pawnbrokers are making money, somebody is losing. Half of our pawnbrokers have made nothing. People who have watches are able to keep them. Our Chestnut and Market Street houses have begun to do a good Fall business. We have an endless variety of clocks. Wooden clocks are very very cheap. Swiss goods are being displayed in agreeable contrast with our American goods in our store windows. Among certain people there is a growing preference for imported watches, and even English watches are preferred by a select few, because of their supposed regularity over long periods."

The Waltham *Tribune* says:—"There is a demand in nearly every watch factory in the country for first-class jewellers and finishers, and some very high prices are being offered in shops where it is undesirable to work, in order to induce them to make changes. Jewellers seem to be in the greatest demand, and second-class workmen can make big wages now that the demand exceeds the supply."

The Watchmakers' Association, Prescot.

A MEETING of the above association was held on the 16th ult., in the rooms of the Free Library, Derby Street, Prescot, for the purpose of considering communications from the watchmakers' associations at Coventry and Liverpool, and also to elect representatives to attend the conference of the Watchmakers' Association, to be held at Coventry. The chair was occupied by Mr. C. B. Johnson, and there were also present Messrs. J. Berry, W. Eaton, T. Taylor, J. Hall, W. Wright, W. Lloyd, R. T. Willis, J. Haigh, J. Case, W. Ashcroft, J. Jackson, J. Waine, W. Sephton and J. Robinson (secretary).

The Chairman said he wished to make a few remarks before they proceeded to the business of the evening, and these were founded on what he had heard and had had communicated to him since the last meeting. The business of the last meeting came somewhat suddenly on him, and he had not fully weighed what they were about to do, and he was more convinced of the propriety of acting cautiously and carefully from three letters he had received from London. He (the speaker) expressed his doubts at the last meeting as to there being a thoroughly representative and properly organised body in London. He had not seen anything in *The Horological Journal* which made him think he was at fault, and he would say no more on that point. He had two letters from the Vice-President of the Horological Institute, and one from a friend, who had seen the resolutions sent up by Mr. Robinson, their secretary. In the first place, his friend informed him that the body referred to in the resolutions was not an organised body in the trade. The letter said that there was a body, but they were only a section, and they were not recognised by the trade, neither were they looked up to with any authority to bind the trade; but at the same time, he said, they were prepared to accept them, and they did not wish to shut them out if they joined. But he considered the Horological Institute, which was a responsible body in London, was a thoroughly representative body, and they ought to look to what that body was doing when they in Prescot made any arrangement. The letter informed him that there was a meeting of the Horological Council that night, and the Prescot case would be laid before them. He did not think it wise of them to proceed with such great haste in the matter. Their position was one of feeling their way, and he did not think it would become them to send resolutions up to London, and act in a sort of dictatorial manner, as to the course to be taken. He thought it would be the safest way for them to proceed cautiously, and when they found the feeling of the other portions of the trade, they could unite with them. He had some doubt as to whether it was safe to provoke discussion, and whether it would not be better to postpone the business for which they had particularly met that night for a little longer.

Mr. Robinson then read the minutes of the last meeting, which were confirmed. He stated that from the commencement of that association he had corresponded with different parties, and he had sent different letters to London, in order to get hold of the fact as to whether there was a union or not, and he had sent to Liverpool and Coventry to see what they were doing in the matter. He sent to the Horological Institute, and a letter to Mr. Glasgow, with a copy of the resolutions, telling him they looked on that—the Horological Institute—as the central body in the watch trade, and asked him if he would let them in Prescot have his views or the views of the institute on the resolutions he had sent him. He sent him the whole lot of resolutions passed by that association, and he sent him a copy of the resolutions passed by the other associations, which they had received, and he asked him if he would kindly let them know by that night what he thought thereon. However, it appeared Mr. Glasgow had communicated with Mr. Johnson, and in that correspondence he had explained his own private views, and it appeared also they were having a meeting that very evening, and in all probability they would discuss those resolutions. But, whether they discussed the resolutions or not, for his own part he did not see why they should be bound to any decision the institute might come to. And then again there was another body which called itself the Clerkenwell Association, and they had met and discussed their grievances. They had a perfect right to bring their grievances to bear on the public without consulting the Horological Institute, unless the Horological Institute would go with them. He did not see why they should alter one jot or one tittle the resolutions they had already passed.

Mr. Lloyd : We have no right to do so.

Mr. Robinson, proceeding, said that the argument of Mr. Glasgow, that the resolution went too far for some, was the same argument made use of by Mr. Eagles with respect to the jobbers in Liverpool. They could not look upon traders who were continually trading in foreign-made watches and movements, as their friends. They could not look upon jobbers in Liverpool, nor Coventry, nor in London, as their friends. Their aim, he believed, was to receive redress for injuries received by unfair and unjust competition, and to preserve their trade and industry. That was their object, the preservation of the industry with which they were associated. They wished to preserve, and he thought it was their duty to do their utmost as far as they could, to preserve that industry; but they never could preserve it if they allowed others to get in the thin edge of the wedge. Dealers and case makers, he thought, were trying to throw them over again.

Mr. Berry said he had listened with some surprise to the remarks of their chairman. Some years ago they had some difficulty with the Horological Institute, and they could not get anything satisfactory from them, and when they went up to London, they really did not know where to go to. When they went to the President of the Board of Trade, they had the same difficulty to contend with as now. He maintained they had no right to listen to any remarks from this particular institute if it in any way interfered with any resolution that had been passed, especially resolutions which sought to bind the watchmakers of this country, in regard to the introduction of foreign movements in English Hall-marked cases. They were not banded together for the purpose of looking after the interests of the Horological Institute. They were trying to prevent their workpeople becoming paupers, and also to revive the watch trade of Prescot. They had met there not to listen to any remarks of Mr. Glasgow, but they were met for the purpose of appointing delegates to attend some conference in Coventry. Why should they defer that business? What special reason had been given? Why should they be dragged there once more for such a purpose. There was no doubt about one thing, that Prescot must be represented, and he hoped those who were appointed delegates would look after that resolution which had reference to the introduction of foreign movements into English cases. He thought they all knew that he (Mr. Berry) had taken a deep interest in that matter, and he had seen the difficulty they now experienced coming on them for some years. He had conferred with the President of the Coventry Association, and that association was at one with them at Prescot and Liverpool. Why should they listen to the members of the Horological Institute, and especially when such a society as the Clerkenwell Society had been formed? This was a properly organised body, and consisted of some 300 watchmakers. The members of the Horological Institute were indifferent to the watch trade, and did not appoint anyone or hold meetings to discuss the matters which interested them, upon their merits. He was desirous of ignoring the institute.

Mr. Sephton said they were bound to carry out the resolutions passed at the public meeting. They must not depart from doing that which they were instructed to do by the public meeting.

Mr. Lloyd agreed with Mr. Sephton that they were appointed a committee to carry out the resolutions passed at the public meeting. It was their duty to do their utmost to push these resolutions to the front, and, as far as he was concerned, he would not budge one inch either for London or Coventry.

The Chairman said there seemed to be a spirit to throw over the Horological Institute. They were holding a conference that night in which that special business would be laid before them, and he did not think they ought to prejudge them and say the institute would not do anything, and ally themselves to a body which was scarcely looked up to by the trade. He thought they ought to proceed cautiously. He would avoid if possible making enemies or striking out on any different lines. He would work with the whole body of the trade as far as they possibly could. He thought he had stated that Mr. Glasgow himself was quite prepared to work with the existing associations. The hints given him by Mr. Glasgow were simply friendly hints, and were his own individual opinions.

Mr. Berry said it seemed to him to be a very extraordinary thing that the Horological Institute should be so slow in such a matter.

Mr. J. Jackson thought nothing would be lost in waiting for the result of the Horological meeting that night.

Mr. Berry said that the Clerkenwell Society was adopting resolutions similar to the resolutions adopted at Prescot, and these were made a *sine qua non* with the Coventry people. He did not think they should have any formidable opposition from the Swiss, provided they had time to work up their stock.

Mr. Sephton said they were met there for a purpose—the appointment of delegates or representatives to attend the conference at Coventry—and the question arose were they in a position to do that business. If so, let them proceed at once with the business; if not, then let them say so. He did not see that they were in a position to make the appointments that evening, for the reason that they did not know the number they could or should send. He thought they would have to adjourn the meeting.

After some further remarks from other speakers,

The Chairman asked if it was not possible to draw in a lot of those watchmakers who held themselves aloof from them. He did not feel altogether comfortable when there were only 40 of them working in the matter out of the whole trade. He wished to enlarge the boundary of the association and increase their numbers.

Mr. Sephton seconded Mr. Berry's proposition, which was carried.

On the suggestion of Mr. Berry, Mr. Henry Watkinson and Mr. Ralph Greenall, watchmakers, of St. Helens, and Mr. William Brown, Rowson Street, Prescot, were added to the committee.

Mr. Lloyd moved that the appointment of delegates be deferred for the present, and that the secretary call another meeting for this purpose.

Mr. Jackson seconded the motion, which was adopted.

A vote of thanks was then passed to the chairman, and the proceedings terminated.

Mr. J. Robinson, the Secretary of the Prescot Watchmakers' Association, on Thursday, November 11, received the subjoined letter from Mr. Britten, Secretary of the British Horological Institute, London: "Mr. Glasgow, last evening, laid before our council his correspondence with you respecting the sale of foreign watches as English, when the following resolution was passed: 'That the Council of the Horological Institute, following the efforts made by them in March last to the same end, are prepared to take part in, and to forward to the best of their ability, any general movement of the trade to obtain such alteration of the law as will prevent the official assay offices of this country assaying and stamping foreign-made watch cases.'"

Copying Drawings by Chemical Process.

THERE are so many methods of copying drawings or tracings on sensitised paper by exposure to light, that to describe them all would require a good deal more space than is usually at the disposal of correspondents—I will therefore only give a description of those most usually employed.

There are two processes, of which the others are mere modifications or developments. They are, 1°, That in which the drawing appears in *white lines* upon a blue ground; and 2°, That in which the drawing appears in *blue lines* on a white ground. The first is called the Cyanotype or Ferro-prussiate process; the second, the Cyano-ferric process.

The Ferro-prussiate Process.

The tracing to be copied is made from the drawing in the usual manner, care being taken that as clear and transparent a tracing paper or linen as possible be selected, and to have the Indian ink as thick and as opaque as it can be used. The sensitised paper is prepared as follows:—10 ozs. of red prussiate of potash ($K_3\ Fe\ Cy_6$) is dissolved in 32 ozs. of water; then 15 ozs. of ammonio-citrate of iron $\left(\left.\begin{matrix}NH_3\\ Fe_2\end{matrix}\right\} C_6\ H_8\ O_7\right)$ are dissolved in 32 ozs. of water. The two solutions thus separately made are mixed together in a dark room and filtered. (The dark room used here and in subsequent operations need not be *dark*, for if yellow paper be carefully pasted over the glass windows admitting the light, or if the glass itself be stained yellow, the light passing is innocuous so far as the sensitised paper is concerned, as the actinic or chemical rays are cut off). The solution thus prepared is applied to the surface of ordinary web drawing paper, either by drawing evenly across it a soft sponge saturated with the solution, or, better, by pouring the solution into a large shallow bath and floating the paper in it, having first turned up the edges of the sheet all round to prevent the solution getting on the back. Two or three minutes' floating will suffice. The paper is then hung up to dry. All these operations are conducted in the dark room, care being taken to prevent the actinic light getting at the solution or the prepared paper. A wooden frame containing a sheet of plate glass, and furnished with a sheet of soft thick felt and a removable wooden back—practically similar to the printing frame of the photographer—is required. The wooden back and felt pad are removed, and the tracing to be copied is laid *face* downwards on the glass. The sensitised paper is then placed with the sensitised face upon the tracing, and upon the top of these the sheet of felt. The wooden back is then fixed in place, and the pressure exerted by this acting on the soft and elastic felt presses the tracing closely and smoothly without wrinkles against the glass. The frame thus arranged is exposed to the direct rays of light, the time of exposure varying with the intensity of the light. It is usual to arrange test slips of the sensitised paper in the frame with their ends projecting, so that they can be withdrawn and washed from time to time to mark the progress. Over-exposure is preferable to under-exposure, as extra flushing with water will bring out a dark copy; but there is no remedy for under-exposure. The washing is conducted in the dark room in a shallow wooden bath. When the white lines and blue ground are seen to be fully developed, the copy is hung up to dry.

The baths and frame are usually constructed of a size to admit of the largest drawings that may require to be copied.

The chemical reaction in this process appears to be as follows: When the actinic rays penetrate through the transparent tracing paper, the ferr*ic* citrate is partly reduced to a ferr*ous* salt, which immediately unites with the red prussiate of potash ($K_3\ Fe\ Cy_6$) to form a compound, which, in the action of washing, forms Prussian blue $\left(\left.\begin{matrix}Fe_2\\ Fe\end{matrix}\right\}\right.$ ($Fe\ Cy_6)_2$, which deeply stains the paper. The parts where the opaque Indian ink lines have obstructed the action of light remain unchanged and are perfectly soluble, and in the process of washing are entirely removed, leaving the surface of the paper quite white.

This process is by far the simplest, but it has two very serious disadvantages: alterations in the copies thus produced are with difficulty made—Chinese white being usually employed for this purpose, but with by no means satisfactory results. And, again, when these copies are sent to the shops for the guidance of workmen as working drawings, dirty hands soon effectually remove all traces of the white lines, with the result that the copy becomes useless.

To overcome these difficulties or objections, a process has been devised whereby a copy can be obtained in blue lines on a white ground. This is called the

Cyano-ferric Process.

The sensitised paper for this process is prepared by floating the common web drawing paper in a liquid mixture composed as follows:—1°, Dissolve 2½ ozs. of perchloride of iron ($Fe_2\ Cl_6$) in twice its weight of water; 2°, Dissolve 6 ozs. of gum arabic in 28 ozs. of water; 3°, Dissolve 4 ozs. of ammonio-citrate of iron in water; mix the three solutions thus separately made together in the dark room; float the paper in the bath as before, and hang up to dry. The solution should be used at once, as it soon alters. The sensitised paper will keep for almost any length of time if, after drying, it be *rolled* up and kept in a dry and dark place.

The method of exposure is the same as before, only, the paper being much more sensitive, less exposure suffices; but the processes of developing and washing are different. Three baths are required, and the copy is immersed in them consecutively in the order in which they are here described: 1°, A bath of a saturated solution of yellow prussiate of potash ($K_4\ Fe\ Cy_6$); 2°, A water bath; 3°, A bath of diluted hydrochloric acid ($H\ Cl$)—about twelve of water to one of acid.

The action is explained as follows: Where the light penetrates through the tracing paper the perchloride of iron ($Fe_2\ Cl_6$) is reduced to the proto-chloride ($Fe\ Cl_2$); and at the same time the gum arabic appears to be so altered as not to be readily soluble in the yellow prussiate bath in which the copy is first immersed. Where, however, the Indian ink lines of the tracing have obstructed the passage of the light, the gum is unaltered and readily dissolves. The ferric salt in the line and the ferrous salt in the bath immediately combine to form Prussian blue. The copy is kept in this bath until the lines are strongly developed; it is then removed to the water bath, which arrests the action and removes *nearly* all the chemical mixture unacted upon; but this cannot be entirely removed by the water, owing to the gum, it is therefore immersed in the third bath—the hydrochloric acid—which immediately removes the gum and all it contains, leaving the copy quite white. It is washed again in the water bath, and then allowed to dry.

The copy thus obtained is free from the objections to those produced by the former process. Erasures of the blue lines may be effected by the application of a weak solution of carbonate of soda or potash; and blue lines can be added by means of blue ink or paint; and the copy can be coloured, like an ordinary drawing.

There are other processes by which *black* lines may be produced on a white ground, but they are chiefly developments of the last-described process, and the results obtained hardly compensate for the extra trouble and expense.

Robert Marshall.

Watch Jobbing.

By X. O. N.

(Continued from page 118.)

NEW pivots to third and fourth wheels should exhaust that operation by the watch jobber, as, although from the weight of the balance and the smallness of the balance pivots they are more frequently bent and broken than any other pivots in the watch, it is most undesirable to encourage the too often practised art of putting new pivots to balance staffs—although I have known it resorted to by watch manufacturers, in high-class work, when an accident happened, in order not to disturb the adjustment of the watch in positions; but I do not think it could be very successful in such cases, as, however carefully it may be done, the balance will not be exactly in the same poise as it was with the staff true and solid. There are still a few verge watches about the country; and, if a jobber should meet with one with the top verge pivot broken, he may make a good job of putting in a pivot by making a hollow drill (the hole large enough to receive and just free the end of the verge or arbor), and drilling the brass collet on which the balance is riveted a little less than half-way down and breaking off the end (it will break at the bottom of the hole); he can then drive a piece of tempered steel into a brass collet or plug, fit this plug to the hole, drive it in tight, and make a pivot on the projecting piece of steel. This job was always legitimate, as making a new verge meant making half the escapement; but verge watches are seldom to be met with now.

Watches with duplex escapements would soon have become as scarce as those with the crown wheel and verge, but for the advent of the "Waterbury;" and watch jobbers have hastened their disappearance by attempting to make new balance staffs or to put pivots to the old ones. And although it is difficult to make a new balance staff to a duplex escapement, it is quite impossible to put a new pivot and make a good job of it, as, if the ruby roller is left on while drilling for the pivot, &c. (it can only be a top pivot), it will surely get broken; and, if it is removed, the seat on the staff for the ruby roller is so small, that the staff will get broken some time during the operation. If the staff and roller are both broken, and the train in running down strips the points off the teeth of the escape wheel, it is often better and cheaper to have the escapement what is termed "converted," that is, replaced by a lever escapement; but this might be objected to by the owner of the watch, as the duplex escapement was for a long time considered by watchmakers to be the best for pocket timekeepers, and it is not many years since discussions were held on the respective merits of the lever and duplex escapements for pocket watches, the older men in the trade generally preferring the latter. If the staff of a duplex watch is broken, any competent workman can make a new one, if he sets about it in a proper manner. The roller and small collet that serves to strengthen and keep it in its place should first be removed by heating the staff until the shellac is melted, and placed in spirits of wine to remove the old shellac adhering to them; and, as this or the somewhat similar work of applying a new ruby roller is often found difficult by the inexperienced, from their not knowing how to apply the exact heat required, I will describe a makeshift tool that will be found useful. In a general way the roller would be removed by holding the bar of the balance in a pair of long-nosed pliers, and applying the heat to the pliers; but unless the pliers are prepared by having a nick cut across the faces, they are likely to slip, and possibly do mischief by breaking the pivot if there be one; but in any case the heat is not given gradually to the staff, and ceases when the hold of the pliers is relaxed. The tool is an old Swiss pin vice—one of those with a wooden handle, two jaws that spring outwards, and a ring or ferrule that slides and brings the jaws together to grip the wire. If the hole for the wire is filed out large with a square file, and a deep nick is cut at a right angle to this hole, close to the end of the jaws, the bar of the balance can be gripped in this nick, and the ring pushed forward to keep it tight; the heat that is given to the shank of the pin vice will be communicated to the staff gradually and retained as long as it is wanted, without any fear of softening the staff on burning the shellac. The old staff should be driven out of the balance without breaking it, as some of the measurements will be a guide in making a new one. The new staff must be made of the best steel, if it is to stand the process of making without breaking, of sufficient thickness to form the collet and shoulder on which the balance is riveted. The staff may be roughed out first, and hardened and tempered afterwards. The usual mode of judging of the temper by the colour to which the steel is let down is not always reliable, as some steels will be much softer at a given colour than others, although they may have been of the same hardness to begin with: but that must be ascertained by experiment. Some people prefer tempering a staff in oil, and this process has the advantage of making a piece such as a staff of unequal thickness of equal temper throughout. If the staff is placed in an old teaspoon or tablespoon filled with oil, and held over a spirit lamp until the flame of the lamp just catches the oil and is then removed, it will generally be found to be of the proper temper for turning; but the staff should be left as hard as it can be turned. The seat for the balance is first turned to fit the balance tightly; the shoulder on which it rests must not be undercut but square, and only a very little of the seat of the balance left for riveting, the rivet undercut as much as possible, and the seat for the spring collet made and fitted to the collet, and that end of the staff reduced to the required size. The screw ferrule can now be reversed and the pallet fitted. The fitting of the pallet is of the greatest importance, as it must be tight on the staff and yet be easily moved; here the old staff will be a guide as to how far the pallet should be from the balance, but it must not be let up too far until the pivots are made. The seat for the roller can then be turned down to nearly its ultimate size, and the pivots made. The balance can now be put on the staff, and, with the bottom jewelling in its place, the staff shortened until the balance is about the thickness of the jewel hole above the escape cock, and the lower pivot made and finished; the top pivot can now be made. The height is easily got by placing the balance cock in position, and resting the jewel hole loosely on the centre of the staff, when the length of staff necessary for the pivot can be easily judged. When both pivots are made, and the proper amount of endshake is obtained, the balance can be riveted; and in riveting a steel staff, no chamfer must be made in the arm of the balance or hole in which the staff is riveted, as hard steel will not spread to fill up any chamfer; and, as I have pointed out, very little rivet should be left, and not too much hammering, if the balance is to go on true. The Swiss round stake, that revolves with different sized holes, and round punches, is best for riveting balance staffs, as the punches, being kept upright, keep the balance true. When the balance is riveted, the small part of the staff for receiving the ruby roller must be worked down in a bead in the runner of the turns with a steel polisher and sharp red stuff, until the roller fits it easily; the oil should then be removed from the staff by dipping it in benzole. Or otherwise, the arm of the balance fixed in the tool described, a very little shellac melted on the small part of the staff, and the ruby roller moved until the shellac has filled up all the space between it and the staff and the small collet placed on the staff. The position of the notch in the roller should be noted, so as to bring the quarter-screws of the balance in the right position. This is of importance, as it is necessary to draw the balance screws sometimes in duplex watches to get the time in positions right.

Nearly all that has been said about making a balance staff to a duplex escapement is equally applicable to making a balance staff to a lever escapement, only the latter is much more easily made. The proper fitting of the balance roller and spring collet is of equal importance, and the quality of the steel and its temper should not be overlooked, as it is rather trying to find after the staff is finished that the pivots bend with the least pressure, or break without any apparent cause, and all because any bit of steel that is found in a drawer is thought good enough to use for this purpose. It has been the practice with most English escapement makers to put brass collets to the balance staffs of all but the best escapements, a practice that can only be accounted for by the fact that many of them had not the proper appliances for roughing out solid ones. But roughing out a soft staff in the turns is not bad practice for an apprentice, and when once roughed out there can be very little difference between the trouble of making a solid or a colleted staff. A solid staff is certainly the best, as the seat for the spring collet can be made much smaller, and permits, in consequence, of a smaller collet, which can be better fitted and more easily removed; but the jobber can only partially remedy this defect by making a solid staff. The balance staff to a lever escapement must be finished before it is riveted into the balance. The pallet staff of the lever escapement is sometimes broken, and there is little to be said about making a new one. The arbor should not be made too tapering, as one sometimes finds the pallets loose on it, from this being the case. If the staff is made to thorough holes, the shoulders of the pivots should not be left large, as, if so, the friction of the shoulders will be many times that of the pivots; and if the shoulder of the upper pivot is large, it will materially assist in drawing the oil on to the pallets. In Swiss watches the staff is usually screwed on to the levers and pallets, and these staffs are so short that the difficulty of making one is often considerable if a screw ferrule is used. But for making a short staff, or pivoting a scape wheel pinion, thin brass ferrules should be used. These ferrules are easily made, and a stock of a couple of dozen would be sufficient for all purposes. They need be only the twentieth of an inch in thickness, and the groove being narrow and cut deep prevents the hair of the bow from slipping off every time the work is taken out of the turns. These ferrules are used by escapement makers, but watch jobbers generally try to rub through with what tools they have got, the result being often a loss of time and temper, and a bad job as well.

(To be continued.)

A "Jubilee" Mayoral Chain for Blandford.

A JUBILEE memorial of a very appropriate kind, in the form of a special chain and badge, is to be presented to the ancient town of Blandford. The entire piece has been designed according to the wish of Mr. J. W. Luff, the Mayor, who is also the donor, to connect the event with the civic decoration. The centre link of the chain bears a finely enamelled portrait of Her Majesty the Queen, surmounted by the Imperial Crown, and enriched by festoons of laurel. On the reverse appears the motto, "Victoria Regina et Imperatrix." Beside this centre link are two reduced representations of the ancient maces of the borough, dated respectively 1609 and 1770. Shields at each side in large links of Elizabethan character display the Royal and Imperial Arms, with correct coronets. Next comes on one side the enamelled inscription on an escutcheon, "Jubilee, 1886-7," and on the corresponding shield on other side of chain the name of the Mayor for the same period. The series of large links round the chain have mural crowns, from which rises the Prince's feather, part of the borough cognisance, as it anciently pertained to the honour of the Duchy of Lancaster. The series of larger connecting links round the chain are alternate letters, which together make up the name of the town, "Blandford Forum." The badge itself is entirely original in conception. The medallion containing the arms, richly blazoned in enamel, has around it festoons of oak depending from English roses. Above it curve two cornucopiæ, between which is seen standing a carefully modelled figure of Justice, with scales evenly balanced and sword in hand. She is not blind, however, as usually represented; the idea being to indicate that by means of enlightened Justice during the 50 years of the reign of Queen Victoria a double share of plenty and prosperity has prevailed. The whole work has been thoughtfully carried out by Messrs. T. and J. Bragg, of Birmingham, and will prove an admirable and suggestive municipal record of the occasion, while being an important civic decoration.

Close of the Birmingham Industrial Exhibition.

THE Exhibition at Bingley Hall, which was opened on August 26, was formally closed on Saturday, October 30, by the Mayor (Alderman Martineau). The ceremony took place at half-past nine o'clock, when there was a large assembly. In declaring the Exhibition at an end, the Mayor said the remarkable success which had attended it was not altogether unlooked for by all who knew the tone and the determination with which the Exhibition was taken up, and the objects which were set before those who were the promoters of it. Their ideal was a high one; they did not want to establish in Bingley Hall any mere bazaar, they wanted only an exhibition which would be good all through. What had been the results of the Exhibition? During the nine weeks there had been no fewer than 350,000 visitors who had paid, and there had been in addition—and he mentioned this with the greatest pleasure—30,000 school children admitted free. There had been received by the Exhibition Committee no less than £11,000, and the expenses of working the Exhibition would only amount to about one-half of that sum, giving as the result of the nine weeks' work a profit of no less than £5,500. As the Exhibition was a speculation on behalf of the British Association Reception Committee, the whole of the expenses of that splendid reception would be paid out of the profits. After they had done that there would still, he hoped, remain a handsome surplus. The Exhibition would leave behind it many pleasant memories of that artistic and industrial skill which had made Birmingham what they were proud to call it—the toyshop of Europe and the workshop of the world. It would also be remembered for many instances of what they might look forward to with still greater pride—the energy and public spirit and the self-sacrifice of their best inhabitants. His Worship then declared the Exhibition closed.

Birmingham News.

From Our Correspondent.

I CANNOT report any material improvement upon last month. My fears with regard to the solidity of the revival, lately so loudly trumpeted, have proved to be well founded, and to-day there is but little difference in the amount of business done; any increase can only be accounted for by the arrival again of the Christmas season, which invariably causes a state of activity. Possibly my reading may be wrong—I hope it is—but at any rate I cannot hold out hopes of a speedy return of the prosperity of the olden times, and content myself with recording an increasing tendency on the part of large buyers to obtain the lowest possible quotations; the largest quantity possible of approvals; the greatest possible desire, naturally, to sell them; and the longest credit they can possibly squeeze out of creditors for goods charged from approval—and these things they consider good trade! They may make brisk times for factors' clerks and stock-keepers, but they certainly are not safe signs of a revival, and have a contrary effect upon manufacturers, whose resources are considerably taxed by them.

* * *

Referring to the late Industrial Exhibition, everybody is astonished at the rapidity with which the hall was emptied of its contents. Commencing at 6 a.m. on the Monday, the workmen were vigorously engaged upon the task; platforms were taken down, Old Birmingham was again demolished, and cases lately crowded with various specimens of our manufactures were packed and despatched—a continual stream of loaded wagons carried off the goods which so recently astonished and delighted the public. Under the terms of the contract, Saturday evening, October 30, was to see the commencement of the preparations for the coming Cattle Show, and the energy of the Exhibition officials prevailed over all difficulties; in *four* days the glory of our first great Exhibition had departed, and what had been a region of wonder was reduced to a wilderness of tan and iron girders. To give an idea of the rapidity of the exodus, I may mention that the English Watch Co.'s stand of *thirty* feet, double frontages, together with the many machines, shafting, benches, show-cases, &c., was removed in three hours.

* * *

German silver goods and rough metal are in greater demand the Birmingham as well as Sheffield houses doing a pretty fair business. A representative of a leading house here tells me he has just received an American order, with cash enclosed, for £500 worth of German silver articles. I hope it is not the last.

* * *

Jewellers are evidently determined to take full advantage of the Jubilee year. It is a long time since there was such a demand for commemorative trinkets, and the ingenuity of our manufacturers is now taxed to the full to turn out novelties. We shall have Jubilee scarf pins, Jubilee rings, Jubilee brooches, Jubilee pendants, Jubilee lockets, and an innumerable host of other knick-knacks. It is a pity that Jubilee year comes round so seldom.

Factors continue to report a fair amount of business, but they are not by any means overburdened.

* * *

The chain trade continues in a very low state, scarcely anything being done. A new market must be found. Evidently gold chains won't sell in England.

* * *

Your readers may look out for the appearance shortly of what will certainly be the greatest novelty of the day. Its sale will speedily run into six figures, if it does not into seven. I shall reveal the secret as soon as the patentee gives permission. It is an article in daily use in a costly form, but will be brought within the reach of the poorest households.

* * *

There is but little improvement in the watch trade. The approaching season, in which men's hearts are supposed to be generously disposed, usually moves the trade a little at this time, but it has as yet experienced no improvement worth mentioning. Ye uncles and kind aunts, come, buy watches for the lads—not Waterburys or Walthams, but English levers.

* * *

Mr. O'Connor, the British Chargé d'Affaires at Pekin, has, in accordance with the instructions of his official chief, Lord Iddesleigh, forwarded samples of the implements used by the Chinese for agricultural purposes, with a view to their being manufactured and exported by Birmingham manufacturers. From personal experience among the Chinese I can vouch for their business tact and readiness to make a bargain; and providing quality and price are right, there is no doubt that this effort to establish trade with them will be eminently successful. Why not carry the enterprise a step further and place in the hands of trustworthy agents parcels of jewellery? Dollars change hands by the thousand very rapidly in business circles as well as round the dice box; and Chinese ladies are not impervious to the attraction of fine gold work. I frequently saw Chinese merchants riding first-class tricycles of Coventry make, and there is no reason why they should be debarred almost entirely, through lack of energy, from purchasing the wares of our jewellers.

* * *

Mr. Arthur Addinsell (of the firm of Addinsell & Wilkinson, chartered accountants, Bennett's Hill) has been appointed to investigate on behalf of those firms in Birmingham who are involved to the extent of £10,000 or £12,000 in the failure of Messrs. Rothschild & Co., jewellers' factors, of Toronto. Mr. Addinsell, who has left for Canada, has, it is easy to see, undertaken an office of great importance, and I trust his reports will be more cheering than at present we can hope for.

* * *

The Grand Regulator Clock of many nations, exhibited at the Exhibition in London in 1851, and lent by Mr. Goold, of Knowle, to the Birmingham Industrial Exhibition, is the most imposing piece of workmanship of the kind ever constructed: and as it is not likely to be on view again, a short description cannot fail to interest those who are not aware of its existence. I do not know who designed this splendid timekeeper, but it is gratifying to learn that it was manufactured here by the late Mr. William Davis, Sen. Its height is 12 ft., and its upper half contains no less than twelve dials, all working from one centre movement. Four of these dials are placed at each side perpendicularly, three down the centre, and a large dial at the top. The large dial gives Greenwich time; below it is placed the solar time, as different from mean time: under that is a year dial showing the month and day of the month; and, lowest in the centre, is a seconds dial. The year dial differs from the others in this respect—instead of having a revolving hand, the circle itself revolves, bringing the day of the month to a pointer placed beneath. The eight side dials show, respectively, the time at Sydney, Madras, New York, Canton, Calcutta, Paris, St. Petersburg and Constantinople. These, unlike the English dial, have the 24 hours marked on them in two series of twelve hours each, marking from noon at the top to midnight at the bottom, descending, and from midnight to noon, ascending. The escapement is Graham's dead beat. During the Exhibition great numbers of visitors were attracted by the rich decoration of this piece of mechanism.

* * *

Messrs. S. Blanckensee & Son have just manufactured a beautiful casket which has been presented to Sir William Armstrong by the Corporation of Newcastle-on-Tyne. The casket, in which the certificate of enrolment as a free burgess of the city was enclosed, is an exquisite work of art 15 in. long by 14 in. high, and 8 in. wide. It is made of carved oak, fashioned out of the foundations of an old Roman bridge built over the Tyne in the year A.D. 120, and it was taken from the water when the bridge was disused and another built some years ago. The action of the water has rendered the oak of a jet black colour. Apart from the interesting fact that the wood has lain in the water upwards of 1,700 years, the casket is of a unique description. It contains two inscriptions: the one on the front part of the lid testifying to the fact that the casket was "Presented by the Corporation of the City of Newcastle-on-Tyne to Sir William George Armstrong, C.B., with the Freedom of the City, conferred by the Council on September 1, 1886." Then follow the signatures of the Mayor, Sheriff and Town Clerk. On the other side is an inscription relating to the material of which the casket is made. Both inscriptions are wrought in solid 18-carat gold. On the front, in relief, are the Newcastle city arms, crest and motto; the crest being ingeniously worked so as to form the key-hole of the lock. The shields are wrought in 22-carat gold with platinum bearings, and on either side are two gold plaques, one bearing a model of the old castle, and the other the tower of the cathedral of St. Nicholas. On the reverse side of the casket appear the coat-of-arms, crest and motto of Sir William Armstrong, and two panels representing the Newcastle High-level Bridge and the Swing Bridge. The ends are also panelled in gold and bear representations of the war-ship "Esmeralda" and a correct model of the Armstrong gun—the whole of the details of the latter being cleverly brought to view. The casket is surmounted by a group representing Benevolence, also worked from the solid in 22-carat gold. The woodwork of the casket, which rests on four pedestals, is richly carved; and the casket is lined with crimson velvet. The whole of the work—even the wood-carving—has been executed on the premises, and as a specimen of Birmingham art manufacture it reflects the highest credit upon the eminent firm responsible for its production.

The Manufacture of Watches, from an Economical Point of View.

By David Glasgow, Jun.

(From *Industries*, November 5.)

THE great interest evinced of late years in watchmaking by scientists and the public generally, as shown by the various lectures given and papers read by such men as Professors Ayrton and Norman Lockyer, and Dr. Waldo, and last, but by no means least, the reference made to the subject in the recent address of Mr. Jeremiah Head, President of the Institution of Mechanical Engineers, added to the depression which has now for so long existed in all branches of the industry, is one of the signs by which we may know the trade has passed, or is passing, through a crisis of a very serious kind. The general reasoning as to the laws of supply and demand will only to a certain extent apply here, at all events as regards the English manufacture ; we must look further to find the main cause for the existing state of things ; and although, of course, over production, or under consumption, has a good deal to do with it, the chief causes of the crisis are probably to be found among the following heads : (1) The alteration of public taste and requirements ; (2) General foreign competition ; (3) Unfair or dishonest foreign competition ; (4) The fiscal laws, which virtually exclude English watches from foreign markets ; (5) The general alteration in the system of production of watches. The alterations of public requirements in articles of luxury are in most instances simply the evolution or changes of fashion, and to some extent this has been the case with watches. But the widespread use and universal application of timekeepers, in every branch of mechanical and other art, has brought about a corresponding change in them with almost every advance of science. Thus, to the first cause is attributable all the different variations in the shape of the watch and case, design and style of the latter, &c., which have taken place from the time of the original Nuremberg eggs, and the introduction of keyless watches ; while to the second may be ascribed the innumerable stop watches, chronographs, and other complicated watches of every description, at present in use. This latter demand in itself has had a serious effect on the English trade, from the greater facilities for the manufacture of such watches possessed by the Swiss, added to which it has opened up to them an extensive field in other directions. General foreign competition is, after all, hardly a satisfactory reason for the decadence of an industry ; and although, of late, this has become much more energetic and aggressive than in time past, to bring it forward as an explanation of the existing depression would be a distinct admission of passive weakness that should not be contemplated. But the third heading —"unfair or dishonest foreign competition"—is another thing altogether, and is of far different and more serious import. This involves, among other things, the law in relation to Hall-marking; and, as the question, as it affects watchmakers, is very little understood by the lay public, a short statement of its working will doubtlessly be of interest.

The law, as it stands, compels the Goldsmiths' Co. and other public assay offices to assay and mark any cases (irrespective of their place of production) which may be sent to them through the agency of persons registered as case makers, that come up to the required standard of the metal, on the ground that the Hall-mark is merely a guarantee as to the quality of the metal, and not in any sense a trade mark as showing the goods to be of English manufacture ; and as a consequence of this, foreigners, and notably the Swiss, largely avail themselves of the opportunity of getting their goods stamped with a mark which renders them more readily saleable in this and other markets, than the guarantee mark of their own respective countries. Under cover of this privilege, a large number of Swiss manufacturers are now doing an extensive trade in watches made on the English model ; and bearing, as they do, the names of English watch sellers, it is impossible for any but experts to detect them as of foreign manufacture, owing to the closeness of imitation and the Hall-mark in the cases. To convey an idea of the extent to which this trade is carried, it is only necessary to state that, according to reliable estimates, there have been more cases of foreign manufacture stamped at the Goldsmiths' Hall during the last few years than there have of English. But, notwithstanding numerous agitations in the various manufacturing centres, and applications to Parliament through their representatives, the trades concerned have found it impossible to get this grievance even so much as considered. The only remedy would seem to be that the public, when purchasing watches, should insist on having with them a written guarantee, specifying them to be of English manufacture. The question of political economy involved in the fourth heading—"the fiscal laws which exclude English watches from foreign markets"—which is not peculiar to the watch trade alone—is, of course, of too extensive a character to be profitably discussed in an article of the present scope. It may, however, be noticed here that the chief, if not the only, reason for the loss of the United States market, which was the principal consignatory of our export trade, has been the prohibitive duties imposed on English, in common with other foreign-made watches, and not their being driven out by the home productions in equal competition. This assertion may possibly be objected to on the ground of the presence of American watches in this country competing with our own ; but it must be remembered that the English market is free from all import duties, and is as easily accessible to the Americans as one of their own ; added to which their large and increasing production renders it absolutely necessary for them to search for fresh fields for the dissemination of their goods, in order to keep their factories in full work, without which they could not be profitably kept going. Also the American competition is only felt as regards the cheaper grades of watches, that in high-priced watches being altogether inappreciable. The alteration in the system of production of watches is a subject of a very comprehensive character, which can be exhaustively or properly treated only by going into the details and intricacies of what are usually known as the hand and machine systems of manufacture ; but these terms being misleading, an explanation of what they really import is necessary. In the first place, the term "hand made" literally implies fashioned by hand, with the aid of such primitive tools and appliances as are in any way suitable to the purpose. Thus, when we speak of hand-made boots we mean boots that are sewn and nailed by hand, by means of awl and hammer, in contradistinction to machine-made boots, which are sewn and riveted by sewing machines and riveting machines, and this distinction is understood by the public. But this term does not signify the same thing in the case of watches, although it is sometimes understood literally so. I was told the other day, by a gentleman connected with engineering, that he had always thought the cogs, or teeth, &c., of hand-made watches, together with all the other parts, were filed up by hand. Now, in the first of the above senses, there is no such thing as a hand-made watch (that is to say, a watch fashioned throughout in the primitive manner indicated). From the very earliest days of watchmaking, more or less complicated machinery has been used in their construction, such as stamping presses for forming the back and front plates of the frame, or movement, as it is called ; wheel and pinion-cutting engines, &c.; some of the early English and French watches still exciting the admiration of watchmakers from the beauty and exactitude of this latter part of the workmanship ; while, for the last twenty years, both English and Swiss manufacturers have been continually introducing labour-saving machinery in every branch of the business. A modern hand-made watch, then, may be taken, generally, to mean one in which, although all the larger parts of the work have been turned out in machines, a considerable proportion of skilled labour has been employed in the construction of the more particular parts ; while a machine-made watch is one on which little or no skilled labour has been expended, most of the work having been done by automatic machinery. Without going into the relative merits of the two systems, it may be remarked that the former has for its tendency (with all due deference to the opinion of Dr. Waldo) the creation of a greater self-respect and individuality among the operatives employed, with the originality (not, however, always an advantage) and artistic inclinations consequent on the comparative exemption from supervision of the piecework system. The latter is, of course, on the other hand, necessarily the factory system pure and simple, which, whatever may be its economic effects, does not create watchmakers. That this is the case, is shown by the various recent movements that have taken place in different parts of the American Union for the establishment of technical schools. The first has been the characteristic of the English manufacture, while the Americans take the credit of having introduced the second, although the Swiss claim to have been the pioneers in this direction. In consequence of the vague statements made from time to time by different scientific men who have taken interest in the cheaper production of watches, especially with regard to the capabilities and employment of machinery for the purpose, and who have been possessed of that proverbially dangerous quality, a little knowledge on the subject, there is a growing feeling among the public (to which their own quiescence in the matter has contributed in no small degree) that

English manufacturers are standing still in this matter. But this assumption is a great mistake. Watch factories, employing large numbers of hands, where machinery of the most approved character is used, have for a long time been established in London, Coventry and Birmingham; and one of the most marked and interesting indications of the present crisis is the manner in which the two systems are working side by side. Which one we are eventually to adopt altogether, or whether there is room for both, with a consideration of them in detail, are matters with which it is proposed to deal in a future article.

The Largest Observatory in the World.

THE great Lick Observatory, in process of erection on Mount Hamilton, California, about which so much proleptical speculation has taken place in astronomical circles, is, according to the latest American advices, fast approaching completion; in reference to which a contemporary says that the modern stargazers and calculators of times and seasons will hold high festival over this latest gift to the science of the universe.

It was Kant who said that among the things which struck him with awe, the sight of the starry heavens stood pre-eminent. By aid of the splendid appliances of the Lick Observatory, those who contemplate, like Kant, the ideas of infinite space and infinite worlds are certain to become still more deeply impressed. There is a brilliant example of the personal and unselfish endowment of science in the very circumstances which have given this grand Observatory to the world. In 1875 Mr. James Lick gave 700,000 dollars for the erection of this astronomical castle. It is expected that in 1887 the trustees of Mr. Lick will transfer to the authorities of the University of California the building and its contents. About 200,000 dollars of the original bequest will remain after the completion of the work, and this sum, it is stated, will serve the useful and necessary purpose of an endowment fund. The history of the selection of a site for the Lick Observatory, as well as the original circumstances of its promotion, deserves special notice. Somewhere about 1879, a very small building was erected on Mount Hamilton for observatory purposes. It had, as a neighbouring domicile, a little one-roomed cabin serving as a dwelling-house for the observers who came to study the stars literally on the lone mountain peak. The Observatory, we learn, was then insecurely perched on a narrow ridge between two sharp points of rock at the summit. Its dome gave protection to a six-inch equatorial telescope belonging to Mr. Burnham, whose fame as an observer of double stars is widely spread. The Lick Trustees, regarding the presence of Mr. Burnham on Mount Hamilton as a favourable opportunity for testing the advantages of the site for an Observatory, invited that gentleman to continue his observations on double stars for some months. There had, apparently, been some talk of erecting the great Observatory on a less elevated position, but Mr. Burnham's stay on Mount Hamilton in 1879 decided, in the most satisfactory fashion, the important question of site. He proved that on the peak first named all the conditions for successful astronomical research were typically represented. Astronomers elsewhere will read with envy of the clear atmosphere which prevails there for three-fourths of the year. Professor Holden, who is head of the University of California, tells us also of the steadiness of vision which is attainable on Mount Hamilton, and speaks of the absence of twinkling of the stars as a condition favouring the exact observation of 'other worlds than ours.' Nature favours science in respect of position and site, and science, in her turn, is resolved to become better acquainted with nature. To this end the Lick Observatory, equipped, as it will be, with the largest and the best of instruments, bids fair to become in a sense the scientific wonder of the world.

Every schoolboy knows that, as telescope after telescope has been made, each new instrument rivalling and outdoing its predecessors in power, the astronomical vistas simply become wider and more extensive, as if infinite space and its worlds mocked the efforts of man to form even a remote conception of their meaning and history. No one dreams of getting to the end of that which is without bounds, but it is given to modern man to succeed, within certain limits, in advancing very materially upon the knowledge of space and its contents which his predecessors possessed. Lord Rosse's telescope in its day was esteemed a marvel of scientific progress; but beside the infinitely larger instrument, say, of St. Petersburg, the Rosse telescope has to hide its diminished head. The Lick Observatory will in its turn represent advances upon all that has gone before it. We may be certain that the Lick Trustees, together with the authorities to whom they will consign their building and its contents, will take care that each new thing in instruments for watching sun, moon and stars shall have its place among the furnishings of their great watch-tower on Mount Hamilton. As things are to-day, the little one-roomed cabin of 1879 has developed into a little village, wherein the employés connected with the construction of the Observatory have been housed. The building itself rises high above the houses, and a plot of some 1,600 acres has been secured and duly reserved as the Lick Observatory demesne. Captain Floyd, who is President of the Lick Trustees—himself an accomplished astronomer and once commander of the famous Confederate cruiser 'Florida'—and Mr. Fraser, the Superintendent of Construction, have visited every well-known observatory in the world. In this way the concentrated experience of astronomers has been brought to bear on the erection of a suitable house for an instrument which, to quote the exact words of Mr. Lick's bequest, should be 'the most powerful telescope in the world.' Of the magnitude of the works on Mount Hamilton we may form some conception when it is stated that, in order to construct a suitable platform for the telescope and its house, no fewer than one hundred and fifty millions of pounds of the hard rock of the summit of Mount Hamilton had to be blasted away. Miles of roads had to be made, often in very difficult and trying situations, to reach the various peaks where reservoirs were to be constructed and a water supply to be ensured. Gifts of a generous nature supplemented Mr. Lick's bequest. Santa Clara County constructed a road from San José to the summit—some twenty-six miles distance—at a cost of 78,000 dollars, and the Government of the United States granted a large part of the ground on which the building stands. The Observatory Peak, after being levelled, stands 4,302 feet high. It is, indeed, a focus of the latest triumphs of mechanical science. There are clocks from London and from Amsterdam, meridian instruments from Hamburg, and other astronomical appliances from Washington, all accumulated on this lonely peak. It would seem, in truth, as if science had consecrated the mountain-top, and had retired from the busy haunts of men to commune undisturbed with the powers that move the universe.

The object glass of the Lick telescope is said to be one of 36 inches; this measurement beating the St. Petersburg telescope by six inches, and that at Washington by ten inches. In construction this glass will exhibit certain features which render it unique. One of these consists in the readiness with which the great telescope can be at once converted into a camera, and made to photograph the objects on which the gaze of the astronomer rests. How largely the science of the stars has benefited from this application of photography most persons know. A single exposure by aid of the Lick instrument will give a photograph of a very large area of the sky, and a permanent record of observations may thus be readily kept. A comparison of two photographs taken on different nights, it is easy to see, will show changes which might well escape the most careful observation by other methods. The image of the sun unmagnified at the Lick Observatory will be six inches in diameter, and a big sun spot will come out as large as one's finger-nail. We may expect fresh news about the economy of the sun when the Mount Hamilton telescope is brought to bear upon the fiery mass. The great craters or hollows, or whatever the spots may be, within the substance of the blazing hydrogen, may then, perchance, become better known, and the relation they present to cosmical or other disturbances may then admit of more accurate determination than is possible to-day. Comets and nebulæ, which at present are among the most difficult objects of astronomical study, may also be resolved into simpler things. Armed with photographs of these fire darts and fire mists of the sky, the observers of Mount Hamilton will be able to study the vagaries of comets with as much leisure and exactitude as the lines and characters of an ordinary engraving. America is to be heartily congratulated on the noble enterprise which is approaching completion at the Lick Observatory. It is a monument of the spirit which prompts men to devote wealth to the advance of knowledge, and especially to the progress of science with its many and intimate bearings on human prosperity. But there is, likewise, another provision of the Lick bequest which deserves special mention as a characteristic of the general liberality animating the entire scheme: astronomers from every land are to be heartily welcomed at Mount Hamilton as resident observers, for stated periods. The humane spirit which sees in the unselfish search after truth the only needful condition of welcome will assuredly be represented in all its beauty and excellence on the lonely mountain-top of the Californian land.

King Theebaw's Golden Chariot.

THOSE who have visited the Colonial and Indian Exhibition and inspected the Burmese jewellery and art work therein displayed, will be interested in knowing that there now stands at Broken Wharf, in Upper Thames Street, having been privately consigned from Burmah to a leading firm of London merchants, another of the Mandalay relics, no less a rarity in its way than would be one of those sacred animals, the deified white elephants of that extraordinary kingdom lately governed, or misgoverned, by King Theebaw. The curiosity in question is the so-styled "golden chariot" of his ex-Majesty, though, according to a contemporary, it might as correctly be called his "gingerbread coach," being no more one than the other of these two several things, and only holding its present high-sounding designation by euphemistic courtesy. However, as there seems to be no doubt about the authenticity of this royal and more or less resplendent car, its comparatively commonplace and decidedly tawdry character will not detract from its value as an interesting historical possession. Seeing how greatly addicted the Burmese potentates have always shown themselves to the employment of gold in its purest state, covering with thin plates of the precious metal every kind of solid constructive material except ivory, it would have surprised few persons who have seen the despot's treasures in the Colonial and Indian Exhibition, or who have any general acquaintance with regal Barbaric art, had they found every square inch of the quaint and curious vehicle coated, wheels and all, with sheet-gold, not much thicker, it might be, than paper, but still tangible and resistant; quite a different thing, in short, from gold-leaf laid on by the expert and delicate hand of the gilder. As it is, this car is a somewhat incongruous piece of work, carved, gilt and inlaid, or rather tinselled, with small bits of glass set in the manner of precious stones. The Mandalay coach-builder evidently had a French or English model before him, probably some Parisian pattern of the time of the Directory, to which he has added much extraneous ornament. All the working parts, the springs, C and elliptical, the let-down steps, the footboard behind, the axles, and arrangement for a pole, are copied, with an ornate clumsiness, from some European model. With regard to the C springs, it may be said that their practical object does not appear to have been clearly understood by the Burmese artisan, who has so placed them that the poise of the body derives little or no freedom of movement from the imperfect suspension, but relies mainly if not altogether on the stiff support of the elliptical springs below. The panels are traced out in decorative lines of glass mosaic, small enough to glitter like crystals. In the centre of the main division is the Burmese symbolical peacock, in low relief, gilt the same as its flat background. On a curiously prolonged level flooring in front stand a pair of birds, somewhat resembling pea-hens, their uplifted necks twisted round one another, and in front of them is a stock with a deep socket to hold an umbrella. It will be borne in mind that this appurtenance has a sacred meaning, and is intended to cover some person or thing as a canopy or baldaquin over a throne. This foremost umbrella can only be meant to overshade the two sculptured birds, as it is quite independent, and far in front, of the cushioned interior, which is lined with red silk, and was, of course, designed to seat one person only, that person being his Burmese Majesty. From the footboard at the back rises an iron stanchion, which, at a certain elevation, takes a forward bend, terminating in an upright socket for the support of the chief or royal umbrella. All the wood and iron work is gilt, as already stated, and the gilding shows some wear. The wheels have projecting, cone-shaped boxes, of a character belonging to Europe, in the middle or latter half of the eighteenth century. There is no indication of any seat for a coachman, and the absence is at once accounted for if we recollect that the ordinary draught animals in lands like Burmah, in common with most Asiatic countries, are bullocks, which travel at a walking pace, and are led. The principal carving on the chariot is a foliated scroll, bordering the outline of the body. A Burmese painting, which is also in London, represents this singular carriage as the triumphal car in the middle of a procession, King Theebaw being seated in state therein, at some height above the ground, inasmuch as the floor of the chariot is perched above the wheels. We are informed that the vehicle is not to be publicly exhibited.

The History and Object of Jewellery.

By John Jones, F.R.G.S., &c.

(Continued from page 122.)

THE early British race had ornaments of gold, which they might have found in Wales or Ireland, where even now it is procured; but it is more probable that their eastern origin still caused a communication with the regions where it abounds more plentifully. Torques, or collars for the neck, are occasionally found in the earth. In the museum of the Dublin University are two of about the value of £100, of a horseshoe form with conchoidal termini. The substance of the gold is cylindrical; they were found deep in the earth in that country, but, lest the law of "tresure trouve" should baulk the finder of his prize, the place where is not known. They are ornamented with small circles covering the whole surface, neatly engraved. Twisted wires were also formed into bracelets and collars; the usual surface ornament was an imitation of rays of the sun, as in Persian decorations. The gold is always nearly fine; if alloyed, the yellow colour is lost. The Indians, even in the midst of general depression, still keep their gold but little alloyed, probably for the same reason. The copper-coloured gold lately in use in England would have excited their contempt. Roman civilisation introduced goblets of gold, and a more extensive application of jewellery to the purposes of dress. The thorn from the hedge, which to this day the Welsh use for a pin, was supplanted by the fibula and brooch. Vortigern is described as drinking to Rowena in a gold cup.

> "The King said, as the knight gan ken,
> 'Drink hail!' smiling on Rowenen."

History records that Augustine brought artificers in gold as members of his suite on his mission to this country, and presented gold vessels to the churches he established.

The Saxon clergy must have travelled to Rome for education and directions; and of course would not neglect such prominent necessaries as the sacramental utensils. St. Dunstan was a goldsmith, and was at his furnace melting when the fracas occurred which the legend commemorates. A gold ring was found at Carnarvon, date 816, weighing an ounce, supposed to have belonged to a bishop in that district. The pattern is a lozenge and circle alternately; in the lozenge is the dragon of Wessex; it is covered with enamel of fine quality, and the workmanship is true and square.

Offa, King of Mercia, placed a diadem on the skull of St. Alban, when discovered in 796. Edward the Confessor's tomb being opened in the reign of James II., was found to contain a crucifix of pure gold, richly enamelled, suspended to a chain 24 inches long, fastened by a locket of massive gold, with four red stones in it, and a diadem round his head one inch in width. Such instances show that, at least among the kings and clergy, the Anglo-Saxon period held some acquaintance with jewels.

From the time of the invasion of the Normans, for some centuries, Paris became our guide in fashions for jewellery. In the old assay statute of the Goldsmiths' Co., Edward I., 1300, reference is made to the Paris standard, denominated the Touch of Paris, alluding to their practice of determining the value of gold by its touch of hardness or softness on their stone. The Indians to this day use this method of testing fineness. Needles of different alloys are kept by them as standards, and by practice they can arrive at a judgment within five shillings per ounce. Gold work of Paris was also the phrase for superior execution. Among the people jewellery became associated with religious thoughts. The struggle of a saint over temptation was illustrated by St. George destroying the dragon, and rescuing the King's daughter, the church; his military accoutrements figured the panoply of faith.

St. Christopher, of a giant stature, staff in hand, wading through a stream with Christ on his shoulders, was the emblem of the firmness and energy of the mind charged with Christian hope. The monogram of the holy name was also among the ornaments which the allegories of the church supplied.

Chaucer's yeoman had

"A Christofre on his breast of silver shone."

The nun wore

"A broche of gold ful shene
On which was first y written a crowned A
And after, *Amor vincit omnia*."

The monk,

"He had of gold y wrought a curious pinne,
A love-knot in the greater end there was."

On the tombstone of Madoc, Prince of Wales, in Myfod Church, date about 1100, are lovers' knots, forming an ornamental border round a crucifix.

The fanciful temperament of the Norman nobility was not content with such ornaments alone; jewels and gold in every device that Saracenic invention could furnish adorned their garments and their tombs.

In the Geological Museum is a model illustrative of the truly gorgeous spectacle which the tomb of William de Valence, senior Earl of Pembroke, half-brother to Henry III., who died in 1304, presented. Tombs and altar-pieces are the connecting links between architectural and personal decorations. Enamel and gold, with gems interspersed, tell the pomp with which the feudal nobleman moved. The effigy of William de Colchester, Abbot of Westminster, in the abbey, will show the intense splendour which was cultivated at this time. Gold bracelets with two rows of pearls as the borders, and stones between set in the form of crosses, are on the two arms, and his mitre is wholly covered with pearls of large size; the framework being gold, with alternate crosses and stars formed of precious gems.

In the livery which domestic servants wear at this day we have the remains of their grandeur; it is no longer the sign of relationship and friendship. The party-coloured dress has lost its token of clanship, and is but at present the badge of mercenary servitude.

The infection of splendour reached the cities, and their guilds were

"Y clothed in a livery
Of a great and solemn fraternity."

Black is still the emblematical livery of death; other colours have lost their significance.

The Puseyite controversy turned on the black or white gown in the pulpit: the latter being the priestly vestment, therefore authoritative; the former academic, therefore human.

In the year 1453, Constantinople was taken by the Turks, and the inhabitants of Morea took refuge in the free cities of Northern Italy, bringing with them what yet remained of Greek art. Fortunately there ruled at Venice men who could appreciate this accession to their country's wealth, and with means equal to their desires. The Medici family have found in their patronage of art and homage to genius more fame than their princely revenues alone could have brought them. Lorenzo formed an academy of letters and a museum of antiquities. The study of figure, which mysticism had supplanted, again revived; classical fables were the subjects of the modeller's skill, and the pages of Homer or Virgil supplied the stories with which the sacred vessels of the Roman church were beautified. Bishops of Spain disputed with the merchants of Florence as to the services of distinguished artists, and the Pope granted an easy pardon for murder or the worst offences as the bribe for priority of attention from the most accomplished goldsmith. Commercial wealth had reached its zenith, the clergy had lost their esteem for their own occupation, and both found a new and satisfactory excitement in the outbreak of genius which ushered in the fifteenth century. Among those whose names have obtained a European celebrity is Benvenuto Cellini, a goldsmith of Florence; his life, written by himself, explains how much he was indebted to the antique gems for his success. Labourers from Lombardy came down to the southern parts of Italy to work in the vineyards, and frequently found in the soil exquisite engravings. While working at Rome, Cellini bought many of them, and took them as his models in form. So great was his celebrity that Francis I. of France sent to engage him, but his offer of payment was so low that it was refused with somewhat of contempt. Francia, whose pictures are in the National Gallery, was another eminent goldsmith. The style of mounting an emerald brooch in the painting of Pietro Perugino, has suggested to modern jewellers the pattern of mounting called the coronet; he preceded Cellini, and had not the advantage of association with the great artists, Raphael and Michael Angelo, whose ideas doubtless assisted Cellini to reach his exquisite grace. A freer style is now discernible; mastery over the difficulties of execution gave scope for the excursions of fancy. All cities rise in their level; excavations in London occasionally expose ancient tesselated pavements; the public baths and halls of ancient Rome are as the vaults beneath the modern city. Energy in pursuit of new designs explored their decorations, and restored the combinations of human and animal form and foliage with which they were embellished. The grotto or cavern style thus gave name to the grotesque.

Foliage of chicory leaves, with flowers of echites, prevailed at Florence; the work of Lombardy was enriched with foliage of ivy, and Rome encouraged the more sumptuous decorations of the acanthus. Scarcely a portrait can be seen of the fifteenth century without rings on the fingers, and the gem engravings of that date rival the antique.

To give the best effect to a brilliant or other gem in its setting was the study of men of the first abilities. Symbolism was worn out, sensualism revelled in its perfection.

The tide of taste which rose in Italy rolled through the Continent, and, passing through Holland, reached England, tinged with the heavy character of the people from whom we derived it. The squareness which the solid character of the Dutch favoured was blended with the lines of beauty which delighted the more imaginative southerns. Accoutrements of leather substituted the silken drapery of Italy, and thus was formed the style which we term Elizabethan. Never were jewels more gorgeously displayed than on the person of the virgin queen, nor did they fail in creating political results. If Spain paraded her imposing spectacles, if Holland boasted of her treasures, if Venice plumed herself on her Oriental grandeur, England need feel neither shame nor jealousy, for Elizabeth outshone them in magnificence. Pearls beamed in triple row around her neck; emeralds, sapphires and rubies shone in her head-dress; diamond stalactites glittered from her ears, and her stomacher blazed with a well-judged combination of the most perfect colours, arranged in those tasteful forms that Holbein had designed or suggested. The British Museum contains a series of designs for articles of jewellery which that eminent painter produced for the wives of Henry VIII. They are such as even now would be accounted fashionable. Charles I. was a patron of art and an admirer of jewels; in 1638, says the Fœdera, he gave his bond to Sir Paul Pindar, the eminent merchant of London, for a pendant diamond cut faucetwise, weighing 21 carats, for the sum of £8,000, which that famous merchant had paid for it; eight per cent. was to be paid for the capital, and the money was to be returned in four years: the alum duty was assigned for its liquidation. It may not be out of place to mention that the fatal ship money was raised for completing the ornamental works of the ship called the "Royal Sovereign." The expense had exhausted the royal treasury, and still the work was incomplete: gilding and sculpture enriched the upper works as became the ruler of the seas. The object was more noble than the means of its attainment. Civil dissension disturbed the progress of art in this country. The ascendency of the Puritans and the still remaining influence of their habits and principles, checked the desire for symbolic ornaments and those that delight the fancy. An edict at the Reformation attached the penalty of death to any that might be convicted a second time of carrying an image. The promotion of decorations in France, consequent on the example of Italy, reached its zenith under the auspices of Louis XIV.: no difficulties of execution hindered the artists of that period from the expression of their ideas; every element in nature became contributory to their designs. Flames of fire, wreathings of smoke, billows of the seas, shells, foliage, animals, cascades, drapery, suggested forms which entered into their combinations.

Better acquaintance with India furnished Europe with filigree jewellery. The want of mechanical skill among the Indian workmen, which prevented them from forming such patterns as they wished in solid metal, prompted the invention of gold thread as a means of effecting their purpose, by coiling it into the required pattern and soldering the coils together. This style, however, commends itself not only for facility of production, but for the elaborateness of beauty which it discloses. An infinitude of graceful lines, the more prominent of which may be marked by small globules of gold soldered on the surface or separating the sections of the pattern, give the ornament the appearance of having been worked rather by the hand of nature than man.

(To be continued.)

The New Gold Fields of South Africa.

A CAPE correspondent writes to the *Times* a long letter under the above heading, descriptive of the De Kaap Gold Fields, which is published, together with a large map, showing the celebrated Barberton district and the Sheba property. The writer contends that the existence of a great gold field has been demonstrated beyond doubt, a series of auriferous quartz reefs and lodes having been discovered and developed, some of them yielding as rich returns of the precious metal as have been found in any part of the world, and continues:—

"For years past gold mining has been pursued with the usual proportion of success and failure in the district of Leydenberg immediately north of De Kaap, but it was not until 1883 that attention was drawn to this locality by the discovery of a reef on what is known as Pioneer Hill. The ground on which the reef was situated formed part of a number of farms which were the property of Mr. G. P. Moodie, formerly Surveyor-General of the Transvaal, and these were bought by a Natal company, which was at once formed with a capital of £240,000 and a directorate in Maritzburg, who threw open four of these farms to prospectors subject to licences and royalty, retaining the others for further development. Early in 1884 several other gold-bearing reefs were found on Moodie's ground and also on adjacent Government ground lying to the north and eastward. The latter circumstance led to the Transvaal Government proclaiming the Government lands as a public gold field in 1885. Messrs. Barber Brothers (from the Cape Colony) then discovered the Umcouchwa reef, and gave their name to the mining township of Barberton, which has sprung up around it.

"The discovery of the Umvoti and Central reefs in the immediate vicinity soon followed, and subsequently prospectors gradually extended their area for a distance of ten or fifteen miles from Barberton, where the Sheba reef was found by Messrs. Hillary Brothers, and, later on, Messrs. Bray and Griffith hit upon what is known as Bray's Golden Quarry, near to the Sheba reef—a huge dyke of quartz, and the quartzite standing out in mass on the hillside, which previous prospectors had passed by, not conceiving it possible to be, what it has since proved, gold-bearing rock of exceeding richness. This property was formed into a company, named the Sheba Reef Gold Mining Co., with a capital of 15,000 fully paid-up £1 shares. It was able after its first crushing to pay a dividend and acquire some adjoining ground, in all about ten claims, the capital of the company remaining the same. Later on it alienated six claims, and formed these into a company called the Edwin Bray Gold Mining Co., the shares of which (£25,000) were divided *pro ratâ* among the original shareholders. The company also purchased an interest in the Sheba Steam Tramway Co., formed for the transport of the quartz from the hill down to the mills at the river, six miles distant. These shares were also divided *pro ratâ* among the original holders. The reef on the Sheba Co.'s property is exposed to view, owing to the foot wall having given way. It shows to a depth of about 500 feet, and is from 4 to 5 feet in width. Besides this reef the company possesses the before-mentioned Bray's Quarry, from which about 600 to 700 tons or more of quartz have been taken and crushed, giving a yield of 8 ozs. per ton. The tailings from these crushings have been tested and proved to contain 4 ozs. per ton. The loss is owing to the sulphate of iron, which covers the gold in a thin coating, and prevents the quicksilver on the copper plates from catching the gold. Fifty tons of this ore have been bought, at £25 per ton, by Mr. Crauwford, of Newcastle, who has shipped some to London for proper treatment. The quarry shows about 50 feet in width payable, undefined walls, and about 40 feet deep. No limit has been discovered to the quarry, and the richness of the ore does not vary in going lower.

"On the Sheba reef the Oriental Co. and the Nil Desperandum Co. have a series of claims, and the Standard Co. has also some ground, but as yet no discovery has been made like the Quarry. The Oriental (owning 36 claims—each claim on these fields being 150 by 400 feet) has a drive at the low level, about 300 feet from the surface, and has thoroughly established the permanence of the reef, the yield by the primitive method of 'dollying' being reported equal to 8 ozs. per ton. The Nil Desperandum (Hillary's) has large reefs on its ground—the one is the Sheba proper, and the other is a parallel vein of lesser width, but containing good gold. Another company—the Wheel of Fortune—has the reef exposed for nearly 100 feet. It is about 3 feet wide and vertical, with every advantage for mining. The last crushing gave 4½ ozs. per ton.

"Running parallel with the Sheba reef, but on the north side, at the distance of about half-a-mile, is a piece of ground known as Thomas's, the property of two brothers of that name, said to be Cornish miners. While the two brothers were prospecting, one of them was taken ill and sat down at a spot where he saw something glittering before him. He examined the shining substance, and the result was they sunk a shaft which has yielded some of the very richest ore. It is doubtful whether it is a 'reef' or only a 'chimney' or fissure they have found. The brothers, however, made £200 a week by crushing the quartz with a 'dolly,' the yield giving the magnificent return of from 25 to 100 ozs. A week or two ago they parted with their property for the sum of £60,000 cash, which was paid them by Messrs. Alder Brothers, representing a syndicate of Cape, Natal and English capitalists.

"While the richness of the Sheba hills is impressed upon us by facts such as the above, there are numbers of properties on which systematic work is being carried out for their development. The Pioneer reef, on the ground of Moodie's Mining and Exploration Co., has been traced through the claims of the Bee Hive, Whitehead, Pioneer, Tiger Trap, and Natalia Companies. In most of the claims the reef has been developed down to the 250-feet level, and varies from 2 to 3 feet, with an average yield of about 2 ozs. per ton. All these companies have machinery erected or in course of erection, and work with water power. Whitehead has twelve gravitation stamps, worked by a turbine. The Pioneer Co. has six stamps, worked with a Pelton water-wheel. Tiger Trap has five stamps, worked with an overshot water-wheel. Natalia and Bee Hive have ordered machinery from England. The Union Co.'s block, on the Allan reef, has also ordered machinery, and has a reef about 3 feet in width, to work which will yield about 2 ozs. per ton. Companies are in course of formation to develop and work the extension of the Allan's reef and Ivy, which are adjacent. From Brickhill and Millbourne's claims (the Alpine), according to the royalty paid to Moodie's Co., the yield has equalled 11 ozs. to the ton. The Golden Hill Gold Mining Co. has two separate reefs, which, in the present low-level drive, have been found to join issue, and now form a large lode of from 3 to 4 feet in width—the yield is from 1 to 1½ oz. per ton, and can be worked with water power. Abbott's reef has been opened up to 150-feet level, and shows 2 to 3 feet, yielding about an ounce or more per ton, to be worked with water power. Bredas and Endore reefs are undeveloped; both veins show visible gold freely, and have lately been acquired by the Moodie's Co. The Moodie's Gold Mining and Exploration Co. has a 10-stamp Sandycroft mill at work in Concession Creek, which is driven by a turbine water-wheel. Just below its site, the Rosetta Co. is erecting a 15-stamp battery; it has opened its reef to a level of 100 feet, and has different shafts and tunnels; its ground is being stoped and stacked for milling. The width of the vein varies from 4 to 16 feet, and yields from 10 dwts. to 2½ ozs. per ton. Preller's, Steven's, and other reefs near Barberton, are in an undeveloped state, but have excellent prospects. There are other parties on equally hopeful ground higher up the range. The Victoria Co., one of the earliest established, has given a return of 31¼ per cent. in its dividends on its capital since its formation. It, as well as the Caledonian, has batteries worked by water power. The Sheba Co. has purchased the 10-stamp battery erected by Mr. J. C. Rimer. Altogether there are over a dozen crushing mills at work on the fields, but for the extent of operations this is very small and inadequate. When the means of transport of the quartz from the reefs to the mills is improved, and proper gold-saving machinery introduced, it is fully expected the profits will be considerably increased, as the yield of gold will certainly be greater when subjected to more economical, careful and scientific treatment.

"Within the last eight months, during which the export of gold from South Africa is believed to have amounted to about £122,000, the importance of these fields gradually has been thoroughly impressed upon the Colonial public. Natal was first in the field furnishing capital to work the various properties prospected; the Cape Colony, and Kimberley especially, is now investing and co-operating in their development; and from all parts of South Africa men are turning their eyes and hazarding their chances on the glittering possibilities of the Barberton and Sheba reefs. Numerous mining companies, under the limited liability law of the South African Republic, have already been formed, with an aggregate capital of about three-quarters of a million. Here is a list of these associations already before the public, with the amount of their capital in £1 shares, but new ones are being added to it from month to month :—

"Amount of Capital in £1 Shares.

Victoria	£12,000
Caledonian	20.000
Sheba	15.000
Abbotts	12,000
Barberton	15,400
Middleton	15,000
Kidson	£18,000
Golden Hill	3,000
Rosetta	15,000
Central	15,000
Union	20,000
Blue Rock	15,000
Bee Hive	20,000
Colonial	60,000
Natalia	8,000
Nil Desperandum	25,000
New Bonanza	4,000
Pretoria	20,000
Roseada	12,000
Standard	10,000
Tiger Trap	12,000
Edwin Bray	25,000
Wheel of Fortune	25,000
Pigg's Peak	200,000
Oriental	60,000
Barberton Prospecting	12,000
Victory	30,000
De Kaap	30,000
Imperial	8,000
Alpine	25,000

"With the formation of companies, scrip-broking soon produced its usual consequences; dabbling in shares suddenly became a feverish passion with a large number of persons, and the scrip of nearly all the companies floated is now at high premiums—some at monstrously inflated prices—out of which a goodly number of the operators have made handsome profits. Fortunately, the banking institutions have given no encouragement nor offered any facilities for carrying on this speculative game; and the classes who have engaged in it are presumably men with available capital dealing with their own means.

"With regard to the climate of De Kaap, it is excellent on the high lands and elevated plateaux throughout the whole year; but after the rainfall of summer, from February to March and April, the lower levels and valleys are malarial, and fever cases are not infrequent. This will always militate against the Delagoa Bay passenger route to the fields during the unhealthy summer season; but for transport of machinery and goods there is no doubt it will be the port of trade. At present the direct passenger and postal route is from Cape Town to Kimberley by railway, and thence, *viâ* Pretoria, to Barberton by passenger coach. The other route is by Natal—proceeding by railway from the port of Durban to Ladysmith, and thence by coach for a distance of two hundred and eighty miles to Barberton. This place, where a little over two years ago the only building was a tiny little shed, has now a population of over two thousand persons. There are three hundred houses, besides other buildings, four hotels, a club house in course of erection, a share exchange, two banks, and a newspaper—the *Barberton Herald*. Eureka city, on the plateau above the Sheba reef, is, however, competing with Barberton for the position of the mining centre of the future.

"Besides these De Kaap Gold Fields, considerable attention has been excited by the more recent discovery, by Mr. Struben, of another gold field in the heart of the Transvaal, in near proximity to the capital of the State. This field is about thirty-five miles south of Pretoria, on a plateau forming the water-divide of the Transvaal on the Heidelberg side of the Witerwater's Rand. There are various reefs, all more or less defined, running parallel east and west; these are in a cement or conglomerate, to which the Boers have given the expressive name of 'banket'—*i.e.*, a sweetmeat equivalent to our sugared almonds. Several Kimberley and other Colonial capitalists have already secured blocks of farms and claims, and are arranging for the working of these by machinery. The Republican Government at the same time have declared a number of the farms open to the public, as they are traversed by gold reefs. From the crushing of Struben's reefs the yield is 1 to 1½ oz. per ton; and when fairly tested with machinery it is estimated that they may give more.

"From Bechuanaland we have news that quartz veins containing gold have been discovered near Mafeking, specimens of which have been forwarded to Cape Town for assay.

"Meanwhile, within the Cape Colony, for the last three months, alluvial gold digging has been prosecuted in the district of Knysna. The finds have not been very great, but about two hundred persons are engaged on these fields, and there are reports of satisfaction with the alluvial deposits and of prospects of payable quartz reefs.

"It must be borne in mind, however, that no 'poor man's diggings' have been found in this country. To get gold capital and intelligence, with energy and enterprise, must be forthcoming. But there is no doubt that, as after the discovery of the diamond fields, the country is entering upon a new course of prosperity, and that, financially, socially and politically, a great future is in store for South Africa."

Edinburgh Exhibition Awards.

Gold Medals.—Messrs. Blackie & Son, Glasgow (2), Educational Works and Prize Books; Messrs. Hobbs, Hart & Co., Safes and Locks; Steel Company of Scotland, Whole Exhibit.

Silver Medals.—Messrs. Baird & Tatlock, Glasgow, "For Comprehensive Exhibits of Excellent and Well-collected Scientific Instruments;" Messrs. William Collins & Co., Series of Science Text Books; Messrs. James Robertson & Son, Designs of Scotch Jewellery.

Honourable Mentions.—Mr. Herbert Thompson, Saw Piercing and Silver Work; Mr. George A. Veitch, Ingenious Measuring Apparatus.

New Book.

A Sketch of a History of the Marine Chronometer, with a review of recent experiences and observations of the causes of variances in timekeeping, by Professor E. Geloich, Director of the Imperial Nautical School in Lussinpiccolo, Austria (German Edition), is announced as being ready by H. Bush, Hull.

Commercial Failures.

According to *Kemp's Mercantile Gazette*, the number of Failures in England and Wales gazetted during the five weeks ending Saturday, October 30, was 469. The number in the corresponding five weeks of last year was 387, showing an increase of 82, being a net increase, in 1886, to date, of 356.

The failures in the jewellery and fancy trades, giving the number in the corresponding five weeks in 1884 and 1885, were:—

1886.	1885.	1884.
14	15	13

Meetings of Societies, &c., for the Month.

Societies.	Dec.
Inventors' Institute, Lonsdale Chambers, Chancery Lane	6, 20
Photographic, 5*a*, Pall Mall East	14
Society of Arts, John Street, Adelphi	1, 8, 15
Geological, Burlington House	1, 15
Numismatic, 22, Albemarle Street	16
Mathematical, 22, Albemarle Street	9
Royal Astronomical, Burlington House	10
Royal Meteorological, 30, Great George Street ...	15
Geologists' Association, University College	3

Clerkenwell Benevolent. The Annual Ballad Concert in aid of the funds will take place on Monday, December 20, at the Agricultural Hall, Islington.

APPLICATIONS FOR LETTERS PATENT.

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, and 6, Lord Street, Liverpool.

13,495. J. Long, Birmingham, for "Certain improvements in the fastening of brooches and other articles of jewellery." Dated October 22, 1886.

13,625. A. L. Piguet, London, for "Improvements in chronograph watches." Dated October 25, 1886.

13,928. J. E. Baugh and C. Hinksman, London, for "Improvements in the humid reduction of gold and other ores." Dated October 20, 1886.

13,975. R. Eras, London, for "Improvements in electric alarm clocks." Dated October 30, 1886.

14,061. J. B. Hannay, Glasgow, for "Improvements in obtaining gold from refractory ores or other auriferous substances." Dated November 2, 1886.

14,147. W. Starley, London, for "A new or improved solitaire or fastening for gloves, cuffs, boots and shoes, and other articles of dress and jewellery." Dated November 3, 1886.

14,238. C. Smith, Rye, for "Securing drapery, jewellery, &c., on to buttons, studs or similar projections." Dated November 5, 1886.

14,389. W. H. Beck, a communication from A. Jaques, France, for "Improvements in chronographs." Dated November 8, 1886.

14,751. J. D. Jones, London, for "Improvements in shirt studs." Dated November 13, 1886.

14,819. J. Walzer, London, for "Improvements in watches." Dated November 15, 1886.

14,829. M. Welchman, London, for "A Jubilee coin jewel ornament.' Dated November 16, 1886.

14,895. H. Davey, Leeds, for "Improvements in clocks." (Complete specification.) Dated November 17, 1886.

Gazette.

Partnership Dissolved.

Eady, Paris & Eady, Red Lion Street, Clerkenwell, goldsmiths; so far as regards E. A. Eady.

THE BANKRUPTCY ACT, 1883.

Receiving Orders.

To surrender in London.—Frederick Henry Connell, High Road, Kilburn, watchmaker. F. Dandridge (trading as the Clerkenwell Watch Co.), late Newgate Street, City. E. Frank (trading as E. Frank & Co.), Redcross Street and elsewhere, fancy goods importer. Fabian Jacobwicz, Milner Square, Islington, diamond merchant.

To surrender in the Country.—John Francis Mason (trading as Frank Mason), Nottingham, jeweller. Leopold Brunner, Birmingham. watchmaker. J. Bicknell, South Molton, silversmith. Arthur Henry Kirk, Lewes, watchmaker. Charles William Hurt (trading as Hurt & Son), Birmingham, jeweller.

Public Examinations.

In London.—F. H. Connell, High Road, Kilburn, watchmaker; December 1, at 12.

In the Country.—J. F. Mason (trading as Frank Mason), Nottingham, jeweller; November 16, at 10. J. Bicknell, South Molton, silversmith; December 3, at 10. A. H. Kirk, Lewes, watchmaker; January 7, at 11.30.

Adjudications.

In London.—F. H. Connell, High Road, Kilburn, watchmaker. F. Danbridge (trading as the Clerkenwell Watch Co.), late Newgate Street, City.

In the Country.—L. Brunner, Birmingham, watchmaker. J. Bicknell, South Molton, silversmith. A. H. Kirk, Lewes, watchmaker.

Notices of Dividends.

In London.—A. Hudson (trading as A. Hudson & Co.). Hatton Garden and elsewhere, optician; 1s. 10d., first and final; any day, 62 Holborn Viaduct.

In the Country.—D. L. Griffith, Denbigh. watchmaker: 5s., first; November 12, Crypt Chambers, Chester. A. Dilger, Stalybridge, watchmaker; 3s. 2d., first and final; November 8, Official Receiver, Ashton-under-Lyne. H. G. Penny, Station Terrace, Kew Bridge, watchmaker; 6s. 10½d., first and final; any Monday, Official Receiver's, 28, St. Swithin's Lane. E. Robinson, Torquay, dealer in fine arts; 3s. 9d., first and final; November 11, Official Receiver's, Exeter. Martha White, Coventry, dial manufacturer; 1s. 11¼d., first and final; Official Receiver's, Coventry. A. Wilson, Halifax, jeweller; 6s. 8¼d., first and final; November 20, Official Receiver's, Halifax.

Correspondence.

All Letters for Publication to be addressed to the Editor *of* The Watchmaker, Jeweller and Silversmith, *Imperial Buildings, Ludgate Circus, E.C.*

All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.

CHRONOMETER RATING.

Kew Observatory, Richmond, Surrey,
November 16, 1886.

To the Editor of *The Watchmaker, Jeweller and Silversmith.*

Dear Sir,—It having been represented to the Kew Committee, by various authorities on the subject of the errors of Marine Chronometers, that the conditions laid down by them for the issue of Certificates for Chronometers rated at this Observatory were not sufficiently rigorous, they have reconsidered their former decision. I have, therefore, to request you kindly to insert in your journal the enclosed copy of the conditions under which certificates will in future be granted to rated Chronometers, instead of those already published. The alterations are as follows : in No. 1 the mean difference or variation of daily rate permissible will be one second, not two ; and the temperature corrections must not exceed one second of variation for change of six degrees of temperature (Fahr.), not one second for three degrees, the previously assigned limit.

Yours faithfully,
G. M. Whipple, Superintendent.

The trial occupies 35 days, divided into five periods of six days each, and five intermediate days, viz., one day at the commencement of each period of test—

1st period.	Chronometer at temperature of	55° Fahr. or	13° Cent.
2nd ,,	,, ,,	70° ,,	21° ,,
3rd ,,	,, ,,	85° ,,	29° ,,
4th ,,	,, ,,	70° ,,	21° ,,
5th ,,	,, ,,	55° ,,	13° ,,

Certificates are granted to Chronometers which have undergone 35 days' test as specified above, and whose performance is such that—

1.—The mean of the difference in each stage of the examination, between (*a*) the average daily rate during that period, and (*b*) the several daily rates, does not exceed one second in any one of the stages.

2.—The mean daily rate has not been affected by change of temperature more than one-sixth of a second (0·16 s.) per 1° Fahr., which is about one-fourth of a second (0·25 s.) per 1° Cent.

3.—The mean daily rate has not exceeded ten seconds in any stage of the test.

Abstract of the Results of Trial of Chronometer No.

By

Rated at the Observatory

from to 18

The following table gives the *Mean Daily Rate* and *Variation of Rate* at each stage of the examination :—

Temperature :	55°F or 13°C secs.	70°F or 21°C secs.	85°F or 29C secs.	70°F or 21C secs.	55°F or 13C secs.
Mean daily rate :	—	—	—	—	—
Mean variation of daily rate :	+ —	+ —	+ —	+ —	+ —

Mean change of daily rate for 1°F or 0·5°C = seconds.

Note :—When the sign prefixed to the daily rate is + it indicates that the Chronometer is *gaining*, and when — *losing*, by the amount noted.

Kew Observatory, Richmond *Observer.*
18

Superintendent.

To the Editor of *The Watchmaker, Jeweller and Silversmith.*

Sir,—The explanation your correspondent "Anxious" asks for of the process of gilding watch wheels will not, I am afraid, "overcome his difficulties." There are two processes of gilding wheels : the old one of laying on the gold in a semi-liquid state dissolved in mercury, and afterwards evaporating the mercury by heat ; and the other by means of the electric battery.

Electro-gilding is the process universally adopted by the Swiss. It is by far the cheapest method, but it has the disadvantage of gilding the pinions as well as the wheels if the former are not protected by a covering. A small ungilt circle may sometimes be observed on the sides of wheels round the pinions where the covering that is put on to protect the latter has extended. These wheels (like all the Swiss gilt work) are first coated with silver to give the surface the granulated or rough appearance of mercurial gilding ; and the time in the battery must be very short, judging from the ease with which the gold can be brushed off.

The Swiss, however, polish the greater part of the wheels of their best watches, and if they want wheels properly gilt, send them to London to get them done. In this branch we have the advantage, as nearly all the wheels of English watches are "mercurial gilt," and every English watch gilder can gild wheels—not, however, equally well, as the art is both delicate and difficult ; and for that reason I do not think this answer will help your correspondent. There is no more difficulty in gilding wheels by the electro process than in gilding anything else, provided the wheels are not attached to the pinions.

Gilder.

"E. G." writes :—How can I legally proceed in case of goods left with me for repairs and not called for again, or otherwise left on my hands, where I have claim for cost of repairs ?

[The watchmaker has a lien upon the goods repaired for the price of the work done, but he has no power of sale either by statute or common law. If the goods, after a reasonable time, say, three months, are sold, the owner would only get as damages the value of the goods less the amount due for work done, especially if notice is given in the shop that goods not claimed within a given time will be so dealt with. Of course the goods should be sold by public auction.—Ed.]

"A Constant Reader" will find on another page a reply to his query respecting the chemical process of copying drawings, kindly communicated by Mr. Robert Marshall at our request.—Ed.

Buyers' Guide.

The Sheffield Smelting Company, Sheffield, *Sell* Gold and Silver (pure and alloyed). *Buy* all materials containing Gold and Silver.

F. W. Powell, Jeweller and Silversmith (Manufacturing), 23, Great Sutton Street, Clerkenwell, E.C. Wholesale only for Gold and Silver Jewellery ; Silver Cigar, Cigarette and Card Cases, Match Boxes, Salt Cellars ; Silver and Glass Smelling Bottles ; Sovereign Purses.

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For cheap, quick, reliable Watch and Jewellery Repairs, by the most Experienced Workmen, send to Alexander Edwards, Watch Material and Tool Dealer, 88 & 89, Craven Street, and 2, Holyhead Road, Coventry. Lists : all Horological Literature.

The Watchmaker, Jeweller and Silversmith.

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The Watchmaker, Jeweller and Silversmith.

A Monthly Journal devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

Subscription.—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

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Editorial.

ONE of the greatest difficulties the jeweller has to overcome is that of obtaining original designs or ideas suitable for reproduction in the precious metals. Most of the household articles in common use have been thus reproduced in miniature, and the designer has ever to go further afield in search of novelties. Birds, beasts and fishes, bicycles and steam engines, wooden shoes and warming pans, have all had their turn. We do not know that the electrical field has yet been trenched upon (excepting perhaps with regard to some few of the odds and ends connected with telegraphy); but with this exception, hardly an object exists that has not its diminutive counterpart among the jeweller's stock. The ideal jeweller should be an educated man in the strictest sense. He should unite the knowledge of the antiquary, the archæologist and the architect in his own proper person; he should be at once chemist, metallurgist, geologist and mineralogist; and have, at the same time, the qualifications necessary for a business man. It would, perhaps, be idle to look for all these qualifications united in the same person, and it may be taken for granted that the ideal jeweller is not to be found. It might, indeed, be doubted if the ideal jeweller as sketched above would have the advantage in these matter-of-fact times. The probabilities are that the purely business man would beat his highly-cultured rival in the competitive race, and that the latter would have ample time to consider in his sanctum whether the time he had devoted to the occult could not have been spent with more advantage to himself and to the community.

Be this as it may there is no doubt that the English jeweller does not err in this respect, but goes rather to the opposite extreme; and there would result a gain to the trade of this country were he to become convinced of this, and take a leaf out of his Continental rival's book in paying some more attention to the requirements of fashion.

It is not very certain whether the changes in fashion, so necessary to the prosperity of fancy manufactures, are the result of a certain definite demand on the part of the public, or whether the fashions are set from time to time by the jewellers' introduction to the market of fresh novelties.

At any rate the demand for different classes of ornament bears some proportion to the nature of the goods obtainable; and, if only from this point of view, it behoves all who desire to remain in the front rank to keep themselves well informed as to what is going on around them. Society is made up of many strata, both socially and from the nature of the various pursuits each section is engaged in or diverted with, and, in order to successfully meet the wants and please the tastes of the different sections, those who wish to cater for the agglomeration should devote at least some portion of their time to studying the particles.

THE popular belief that there are two sides to every question would stand a chance of becoming considerably modified, could the diverse ideas pervading the watch trade as to the best means of removing the various grievances, against which they are now agitating, be put *en evidence.* Fortunately, perhaps, for the dignity of the profession, the public can only partially and dimly comprehend the nature of their complaint; and certainly the manner in which it is brought forward from time to time effectually prevents a clearer insight into the matter on the part of such of the laity as are sufficiently interested in the question to desire it. But, for the same reason, if the various bodies really desire reform, their complaints should be put before the proper authorities in such a clear and tangible manner that they can be understood by the ordinary business man. To such a man it is utterly useless to make vague representations coupled with assertions unsupported by any proofs; and if such representations are continually repeated they will soon be looked upon by those in authority, to whom they are made, as the ordinary grumblings of unsuccessful traders. What is wanted by the great majority of the trade is an alteration in the laws affecting the Hall-marking of watch cases, and not a revival of protective legislation with pains and penalties that would effectually cripple the trade. The difficulty lies in the direction of effecting such an alteration without creating a monopoly in one branch of the trade to the injury of the other branches. There is no doubt, however, such an alteration could be made with advantage to the whole trade, provided the trade were at one on the subject. But while various bodies, each of which has its own peculiar views in the matter, come forward as representing the interests of English watchmaking without regard to the wishes of the great majority of the trade, there is great danger of the principal question being shelved indefinitely as it was before. There would be some chance of bringing Hall-marking within the jurisdiction of the Trades Marks Act were its present effect on the English trade with regard to foreign-made watch cases to be clearly shown, and some feasible alternative properly formulated by a deputation or other body representative of the whole trade. Up to the present none of the principal trade corporations, especially in the metropolis, are taking any action in the matter.

General Notes.

A CURIOUS trial that has just terminated in Paris reminds us of the story of Mark Twain and the mining exploiters of his early days. Mark Twain's story is that certain mining speculators being suspicious of the *bonâ fides* of a person who used to certify in the prospectuses to the percentage of precious metal contained in pieces of quartz he was paid to report upon, sent him a piece chipped off an old grindstone, upon which he, in due time, favourably reported, as was expected. The trial just terminated shows that however visionary a scheme may be, there are still people credulous enough to believe in it and to part with their money. We are now waiting anxiously for someone enterprising enough to embody Swift's idea of extracting sunbeams from cucumbers, and to start a company for the purpose of carrying it out. It is certain to be well supported. M. Popp, the inventor of the pneumatic clocks, thought he could extract gold from millstones, which, he contended, contained from 2,000 fcs. to 3,000 fcs. per ton of the precious metal. A certain number of capitalists were credulous enough to believe that M. Popp could really extract sufficient gold from millstones to make the operation a profitable affair. They, therefore, advanced him large sums of money to work his invention, but the results proved most unsatisfactory. At last, tired of the continual calls made on their purses by M. Popp, they brought an action against him for having obtained money from them under false pretences. Judgment was given in the case on December 3. It had not, however, been proved at the trial that M. Popp had intentionally misled those who advanced him the capital to work his pretended process for extracting the gold, which, it appears, is really contained in millstones, though in less proportions than the inventor seems to have believed. So M. Popp was acquitted.

A USEFUL alloy of aluminum and tin has been obtained by M. Bourbouze, by melting together 100 parts of the former metal with ten parts of the latter. This alloy is whiter than aluminum, and has a density of 2·85, a little greater than that of the pure metal, so that it is not too heavy to replace aluminum in instruments requiring great lightness of their parts. It is less affected by re-agents, &c., than is aluminum, and also is more easily worked. Another of its merits is that it can be soldered as easily as brass without any special preparation.

JOHN FERNIE, M.I.C.E., writes from Philadelphia, U.S.A., in *Engineering*, December 3, as follows, on the American Watch Manufacture:—"I always read with great pleasure the words which fall from Mr. Head, the able President of the Institution of Mechanical Engineers, and I am sure he will pardon me when I call his attention to a great omission he made in his remarks about the American Watch Co. Mr. Head, like a good many more Englishmen who speak about American machinery, gets the facts all right, but does not get down to the philosophy of the facts: and this, I observe, has been the case in like discussions in England about American bridges. Now, in 1876, I visited the watch works at Waltham, and a long account from my pen was published in the *Times* of what I had seen there: this paragraph I copy from that letter. 'I was desirous of seeing how they obtained their scale, and Mr. Webster, the able engineer of the company, informed me he found the thousandth part of an inch too coarse a dimension and the ten-thousandth too fine, and he was led to divide the millimetre into a hundred parts, and found it a proper proportion for his work; and it is from a series of gauges founded on this system that the whole of the watches are built up and the constant accuracy of all their dimensions maintained.' Now in this scale, this series of gauges, lies the philosophy of the success of the American watch, because it is the foundation on which stands the accuracy, the repetition, the almost perfect duplication of a perfect machine, which no one can make any finer. The ordinary fineness of work for the principal part of the watches is $\frac{1}{2540}$th part of an inch, but for the very finest work they can subdivide this into $\frac{1}{5080}$th, or even $\frac{1}{10160}$th part of an inch, and in the manufacture of standard gauges they can work to the $\frac{1}{25400}$th part of an inch. Now what has grown out of this system since 1876 ? The old factory torn down and doubled ; hand machinery replaced by automatic machinery ; watches made for half the cost ; quantity increased three or four times ; quality immensely improved ; in 1876 they were turning out 366 watches a day, in 1886 they were turning out 1,200 watches a day ; and now I come to my moral and apply the wise warning words of Mr. Head about watches to the manufacture of locomotives in England :—'They began by studying the watch as a piece of mechanism. They selected the best points of any current type. They abandoned the pin (*sic*) and chain. They introduced improvements of their own. They settled on a standard type, determined to adhere to it ; made certain sizes and no others. Result : killed the watch trade in England, and would have killed it in Switzerland had the Swiss not adopted American system and machinery.'"

City and Guilds of London Institute.—The Lord Chancellor distributed the awards to the students of the City and Guilds of London Institute, at Merchant Taylors' Hall, on the 13th ult. The Lord Mayor presided, and among those present were Sir F. Bramwell, Sir F. Abel, Sir J. Tyler, Lord Justice Baggallay, Sir W. Charles, Sir R. Rawson, Professors S. P. Thompson and Ayrton, and Lieut.-Colonel Laurie, M.P. Messrs. John Watney and W. P. Sawyer (hon. secs.) read the reports of the Central Institution, the Finsbury College, and the South London School of Technical Art, the returns of each institution being highly satisfactory. The prizes and certificates were then distributed, and the Lord Chancellor afterwards delivered an address. He spoke of the difference between the past and the present condition of technical industry in public estimation. Technical workers were no longer despised as a degraded class ; they were valued for their wide-spread utility. He strongly condemned the subtle evil of cramming—by which counterfeit knowledge was made to pass as the true—and bade the student not to consider the winning of prizes as his goal, but rather as his "stepping-stone to greater things." Votes of thanks were passed to the Lord Mayor for presiding and to the Worshipful Company of Merchant Taylors for the use of the hall.

The *European Mail* says :—"Sir John Richard Somers Vine, of Vine Court in the county of Kent, and of London Wall and the Savage Club in the county of Middlesex, is certainly the best known of the new knights just made by the Queen. As private secretary of four Lord Mayors, as editor 'at Waterlow's,' and as the City and official agent of the four great shows at South Kensington, Sir Somers Vine has done an amount of hard work during the past ten or twelve years which has fallen to the lot of few men, and few will be inclined to cavil at the reward which has attended his labours. He is henceforth to devote a portion of his energies to the difficult task of infusing life and light into the Albert Hall, and he intends to succeed."

Mr. Watherston on Technical Education.—Mr. E. J. Watherston gave an address, on the 16th ult., in connection with the Putney and Roehampton Liberal Association, at the Assembly Rooms, High Street, Putney, on the subject of "Technical Education a National Necessity." The chair was taken by Mr. Meredith. Mr. Watherston complained that the elementary education given was almost solely literary, and that instead of raising a body of skilled artisans and mechanics, we were manufacturing only clerks, male and female ; while for one clever and lucky youth who rose from the national school to the university, a thousand would and must remain at the bench, the anvil, the loom, the engine, and the plough. He held that after the child had learnt to read, write and cypher well, he should be at once inducted into at least the rudiments of some branch of technical industry that would be of use to him immediately upon his leaving school, thus enabling him to master, far more accurately than now, the handicraft he adopted. His scheme would comprise half-time in a workshop school when a fair standard of proficiency had been reached in the three R's, with exhibitions to higher grade technical schools for the most promising of the scholars. He did not suggest that the taxpayers should contribute a farthing more, as the vote for public education, properly administered, was quite sufficient. Some discussion followed, and a vote of thanks was passed to Mr. Watherston at the close.

The way in which an alloy of gold and copper or other metal is affected by a small quantity of impurity presents one of the most serious difficulties with which our casemakers and jewellers have to deal in working gold. It has long been known to workers in the precious metal that minute quantities of certain metals render it brittle and unworkable ; and referring to this, in a lecture at Birmingham, Professor Roberts-Austen, of the Royal Mint, said : "It may be well to demonstrate the fact. Here are 200 sovereigns. I will melt them, and will add, in the form of a tiny shot, a minute portion of lead amounting to only the 2,000th part of the mass ; first, however, pouring a little of the gold into a small ingot, which we can bend and flatten, thus proving to you that it is perfectly soft, ductile and workable. The rest of the mass we will pour into a bar ; and now that it is sufficiently cold to handle, you see that I am able to break it with my fingers, or, at least, with a slight tap of a hammer. The colour of the gold is quite altered, and has become orange brown ; and experiments have shown that the tenacity of the metal—that is, the resistance of the gold to being pulled asunder—has been reduced from eighteen tons per square inch to only five tons. These essential changes in the property of the metal have been produced by the addition of a minute quantity of lead." In the same lecture Professor Roberts-Austen said : "Here is a bar of tin 2 ft. long and 1 in. thick, which it would be most difficult to break, though it would readily bend double. If only I rub a little quicksilver on its surface a remarkable effect will be produced—the fluid metal will penetrate the solid one and in a few seconds the bar will, as you see, break readily, the fractured surface being white, like silver."

The Imperial Institute.—Advices from Ottawa state that the modified scheme for an Imperial Institute has been communicated to the Dominion Government, and although they are of opinion that the original plan has been greatly marred, they consider that they must yield to the prejudice excited against it by various parties in England, and are consequently prepared to allow the sum of £20,000, originally voted for the Jubilee Fund, to be disposed of in any way Her Majesty may be pleased to direct.

A **Testimonial**, consisting of a model of the new Floyd hansom cab and horse, made in silver, which was subscribed for by 89 cab proprietors and 1,816 cab drivers, has been presented to Sir E. Henderson in "acknowledgment and appreciation"—as the inscription on it stated—"of his efforts to improve the social position of the London cabmen during his tenure of office as the Commissioner of Police of the Metropolis." The presentation took place in St. James's (lower) Hall, in the presence of some five or six hundred cab proprietors and drivers, and Viscount Wolseley presided.

The Liverpool Exhibition.—The official statement has been issued of the result of the Liverpool Exhibition, which closed a few weeks since. It shows total receipts £133,000, and expenditure over £148,000, leaving a deficit of £15,008, which the guarantors will have to make good. As an alternative to the payment of this deficit, the Executive propose another Jubilee Exhibition this year, which is intended to demonstrate English progress during the last 50 years. It is anticipated this exhibition will realise £50,000 profit, and in no way seriously interfere with the proposed Manchester Exhibition, the present building being retained for this purpose, and the grounds further improved and rendered more attractive.

ADELAIDE JUBILEE EXHIBITION, 1887.—The Fine Art Sub-Committee of the Royal Commission held their second meeting on Saturday, December 11, at the offices, 11, Henrietta Street, Covent Garden. There were present: Sir Frederick Leighton, Sir John Gilbert, Sir James Linton, and Sir Herbert Sandford, secretary. Sir Samuel Davenport, who, in addition to his labours in connection with the South Australian Court at the Colonial and Indian Exhibition, has been indefatigable as Executive Commissioner of the Jubilee Exhibition in organising and making arrangements as to the representation to be made by European exhibitors, left London on the 15th ult. for Adelaide.

THE PROPOSED EXHIBITION IN BRUSSELS IN 1888.—A meeting of all the committees for the Grand International Scientific and Industrial Exhibition, which it is proposed to hold in Brussels in 1888, was held at Brussels on December 15, when the Minister of Commerce declared that the Government would take the Exhibition under its patronage.

THE AMERICAN EXHIBITION AT KENSINGTON.—The main building now being constructed on the grounds of the American Exhibition of the Arts, Inventions, Manufactures, Resources and Products of the United States, at Earl's Court, Kensington, is entirely unique, and will in itself be a most interesting exhibit. The entire framework of the structure is composed of steel rails, such as are used in constructing railways. Two of these bolted back to back, with the T side out, make a very strong and really ornamental column. The only casting required is an angle iron and eyebar, into which the ends of the rails are slipped. This frame will then be covered with plates of glass and sheets of corrugated iron. The advantages are many. For rapidity of construction it is unequalled, as an acre a week can be easily put up, and it has also the advantage of economy, no skilled labour being required to put it up or take it down, and the material when finished with is as good and marketable as when first purchased. This invention, in fact, solves the problem of large temporary structures which can be quickly and cheaply built.

THE Council of the Art Union of London are about to offer three premiums of £50, £30 and £20, for a pair of dies for a medal to celebrate the Queen's Jubilee.

THE DIAMOND MARKET.—Advices from *Kimberley* state that, notwithstanding the increasing yearly production of the mines, the local market is complaining of scarcity of stuff. All classes of goods are in strong demand, shipments continue favourable, and prices are very firm, with a tendency to rise. The *Amsterdam* market is rather dull just now, although manufacturers are fully occupied. Rough is scarce. The clearers are demanding higher wages. In *Paris* there has been a partial strike of the polishers, which has not, however, affected the trade. Common goods are with difficulty disposed of, but a good demand exists for the finer qualities, and the Jura manufactories continue busy. The *London* trade was somewhat quieter during the month, on account of the unsettled and gloomy weather, while the prices ruling were rather higher.—The steamers "Trojan," "Garth Castle," "Prætoria," "Hawarden Castle" and "Mexican" arrived at Plymouth, bringing a fair amount of average stones from the fields.

AN increased demand for cut diamonds, which has been noticed for some time in Amsterdam, is reported also from Antwerp, which is the principal rival of Amsterdam in the preparing of diamonds for the market. The workmen engaged in the trade have decided to ask for a considerable increase of wages, and they threaten a general strike if the increase be not granted.

SILVER.—The fall we predicted last month took place suddenly soon after we went to press. During the latter part of the month, however, the market somewhat recovered, and the price has remained steady, with some slight fluctuations, at a little over 46d. per oz. for bars, the latest quotations being 46d. per oz. for bars, Mexican dollars 45¾d. per oz.

The Hall-marking Question.—Deputation to the President of the Board of Trade.

ON Wednesday, December 15, the delegates from the various watchmaking centres of Coventry, Birmingham, Liverpool and Clerkenwell were received at Whitehall by the President of the Board of Trade, Lord Stanley of Preston, before whom they laid their grievances, the principal one being the Hall-marking of foreign watch cases.

The delegates assembled at the Hôtel Métropole, where they were met by Mr. H. W. Eaton, M.P., Sir A. K. Rollit, M.P., Mr. H. P. Cobb, M.P., Captain Penton, M.P., Mr. J. S. Dugdale, M.P., and Mr. W. F. Lawrence, M.P. They afterwards proceeded to the Board of Trade offices, where they were met by Mr. A. B. Forwood, M.P. Lord Stanley was accompanied by Baron Henry de Worms, M.P., Political Secretary to the Board of Trade; and by Mr. Calcraft, Mr. Courtenay Boyle, C.B., Sir Thomas Blomefield and Mr. Chaney.

Mr. FORWOOD, in introducing the deputation, said the gentlemen composing it came from South-West Lancashire, a division with which he was connected, to bring before his Lordship various grievances that they experienced in connection with the watch trade. The gentlemen at Prescot had been in communication with those who made watches both in London and Coventry, and also in Liverpool, and there were gentlemen present from each of those places to lay before his Lordship what they considered to be the difficulties they had to contend with, and the grievances which they considered, under the present law, disastrously affected their trade. He should not himself go into the question, because there were gentlemen present who had come there specially to do so; but he had no doubt that, after those gentlemen had spoken, the matter would receive at his Lordship's hands that consideration which the importance of the watchmaking industry to the country might lead them to expect.

Mr. EATON said he did not intend to speak at any length on the question which would be brought before his Lordship, which was as to the Hall-marking of foreign watch cases, and the way in which those cases were dealt with after they had been Hall-marked and sent out of this country. There were many gentlemen present who were conversant with the subject, and they would tell his Lordship that, owing to this practice, they were placed in unfair competition in the way of trade; and he thought it would be proved that, owing to the present system, there had arisen what was tantamount to fraud in many cases. It was not his intention to enter into the subject himself, but he would call upon Mr. Walker, one of his constituents at Coventry, to lay before his Lordship what he considered to be a very great grievance.

Mr. JAMES WALKER said he appeared as one of a deputation to lay before his Lordship what they considered to be a very great grievance which they suffered from under the present system of Hall-marking. For ten years past this matter of Hall-marking foreign watch cases had continually cropped up in the trade. Up till that time the trade had been progressive and prospering, but since that time it had been becoming depressed. It was not that they feared competition with the Swiss, so long as their articles were sold as Swiss, but they felt they were unfairly handicapped by the Swiss sending their watch cases into this country, having them marked by the English assay offices, and then putting foreign movements into the cases, when the watches were palmed off on the public in this country and in the British Colonies as English watches—a fraud that was facilitated by the Hall-mark being on the cases. It would be seen how easy it would be under this system for manufacturers producing or buying spurious articles to swamp the markets abroad or flood the Colonies with them, and not only to immediately deprive the English manufacturers of the trade to the extent of those sales, but to get them a bad name owing to these spurious or inferior watches bearing the English Hall-mark. That had been done to a very large extent. It had been no uncommon thing in the trade for a watch to be hung in the shops of large advertising firms, and marked "English lever, warranted our own make;" the price attached to the watch being £4 10s., when the only part English about it was the Hall-mark, and the intrinsic value only 37s. 6d. He thought it would be seen that the purchaser suffered under that system. It had been said in some quarters that the stamp or Hall-mark only denoted the quality of the metal. That might have been the case in the first instance, but it had grown to be looked upon as some guarantee or mark of quality in the watch itself. He produced a watch that some of the makers of the ordinary class of watches in Coventry had been forced, in self-defence, to introduce into the trade. This watch was in a rough unfinished state, and the only part of it that was English was the Hall-mark, the winding part on the pendant and the dial. The dial had hitherto been the part by which they could most easily distinguish an English-made article. These watches had been made in Coventry, not because they liked to make them, but because their customers asked for them, and in self-defence they were bound to supply them. The whole of the movement in the watch produced was foreign. That was one aspect of the question. The delegates present represented Coventry, Liverpool, Prescot and London. Their unanimous wish was that the law should be so altered by a clause or clauses being inserted in the Merchandise (Fraudulent Marking) Bill to put a stop to this practice. He thought that might be done by adopting the clauses of the Bill introduced by the late Sir Henry Jackson, with the addition that any person sending a parcel of goods to an assay office shall sign a declaration that the goods are of his own manufacture and manufactured in this country. He handed in a form of note sent out by the Birmingham Assay Office, and he wanted a declaration somewhat similar to that appended to the note to be sent out and to be signed by the maker of the article. They thought that the clauses of Sir Henry Jackson's Bill, with the suggested declaration added, would meet their case. What they wanted was to put a stop to the Hall-marking of foreign cases by the British assay offices, and to stop the placing of foreign movements in English Hall-marked cases.

Mr. Brooks (London) concurred with Mr. Walker, and said they wished it to be distinctly understood that they were not there to ask for any duty to be placed on foreign watches or to prevent the sale of foreign watches as such. But what they did ask, most sincerely, was, that the foreign watch should not be sold as an English watch. The result of the present system was this: not only were common watches and the most inferior watches placed in English Hall-marked cases to meet a certain demand, but watches that were sold among the aristocracy for £20 or £25, or even £30 and £35, and more, were manufactured in Switzerland, placed in English Hall-marked cases, and sold to the wearers as English-made watches. That, the deputations present protested against. They also asked his Lordship to extend the principle already acknowledged in the Food and Drugs (Adulteration) Act, "That a customer applying for an article shall have that which he asks for." The result of the present system was that they had at the present time thousands of watchmakers, good industrious artisans, who were now living either on their friends or the poor rates. These men were simply out of employment, not so much for the lack of orders, as for the system that had grown up of sending these orders to Switzerland, where they imitated the English watch, and sent it into this country to be disposed of to the wearer as an English-made watch. A case in point occurred the other day, where a gentleman purchasing a watch asked, "Is this really an English-made watch?" The shopkeeper, being on the alert, said, "Look in the case, you will see the English Hall-mark." The gentleman remarked, "Oh, that's sufficient." It was impossible to stand against this gigantic fraud which was now going on. If his Lordship could see his way to alter the present system, he would bring comfort and consolation to thousands of working men who at the present time were really wanting bread.

Mr. Rowson (Liverpool) supported the remarks of the foregoing speakers, and, after referring to the fact that seven years ago a Bill was introduced by the late Sir Henry Jackson to prevent the system of fraud which was now carried on more extensively than ever, said, within a very short period, he could not tell how many watches had been submitted to him for examination, and he had had to certify they were foreign made: in each case the watch had the English Hall-mark upon it, and it had been sold as "our own make." The watches had had to be taken back by the shopkeeper to prevent trouble. The desire of those who now appeared before his Lordship, and of those whom they represented, was perhaps not so much for separate legislation as to get clauses embodied in any legislation which might be brought forward by the present Administration. The watch he produced was purchased in Hatton Garden on the previous day from a foreign manufacturer. Formerly the wearer could tell a Swiss watch by its being an open movement—that was, each working part of the watch was supported by an independent piece; while in the English watch one piece supported the principal going parts of the watch. The Swiss were for a long time content to copy the better watch, but being so successful with that, they had come down to imitating the working man's watch. In the watch produced, not a single portion of it but the Hall-mark was English. The English full-capped watch was relied upon all over the world. There was nothing of English make in this watch produced, yet it had the stamp of the English Hall-mark upon it, and it passed with the uninitiated as an English watch—it was really only when it came to be examined by experts, men who had actually worked at the trade, that it could be detected; even the shopkeepers were in many cases deceived. He mentioned a case in which, in the country, some genuine Coventry-made watches had been put aside by a purchaser who was unable to distinguish foreign-made from home-made, on account of their having the same appearance as the Swiss-made, and the order was given to a London firm; but it was not the English watch that was like the Swiss, but the Swiss watch that was like the English, and the watch he produced was so close an imitation, and had the Hall-mark too, that no one but an expert could detect the difference.

Lord Stanley: Was that watch purchased as an English-made watch?

Mr. Rowson replied that it was not: it was a watch manufacturer who bought the watch, to show what was being done. He asked the seller, a foreign dealer, to whom he was a stranger, "Do you sell this as an English watch?" He replied, "Well, they *are* sold as English-made watches."

Lord Stanley: Exactly.

Mr. J. C. Brown said he appeared there as a representative of the watchmaking industry of Coventry. This was an industry that had been established in that city a great number of years; it had been generally of a flourishing and lucrative character, not only to the manufacturer, but also to the operatives, so that it was not an uncommon thing for a workman of skill to become a manufacturer on his own account. This was the cause why they had so many manufacturers in Coventry—some of them being men who did not make watches in large numbers, but who made a few watches at a time—goods that were sound and well finished, and some of a very high-class character. During the last ten years the trade had been gradually declining, although at the same time the population of the city had considerably increased. This decrease, they believed, had been in a great measure brought about by the practice spoken of by previous speakers—the placing of foreign watch movements in English Hall-marked cases. He might mention that the Coventry Chamber of Commerce, in reply to the question of the Royal Commission on the Depression of Trade, "Are there any special circumstances affecting your district to which the existing condition of trade there can be attributed?" said that, in their opinion, the present system of marking the cases of foreign manufacture with the stamp of the Goldsmiths' Co. injuriously affected the watch trade of the district. The Hall-mark, as applied to watch cases, had been looked upon to a great extent as a national trade mark by the English makers, and had by ancient usage become so; and by skill and industry and superiority of workmanship British-made goods had been established in the eyes of the world, and upon that Hall-mark they had built a reputation and a name all over the world. This was why the foreigner had been trading upon the British Hall-mark. With the Coventry manufacturer it was not a question of cheapness, but of honesty and durability, and they wished to retain that character. It had been said by a gentleman in high position in the trade in London, that he was not asked, when selling a watch, whether it was an English watch or no; but he (Mr. Brown) and his friends contended that the Hall-mark was in itself an introduction to sale, and the ignorance of the general public on the question tended to the belief that when they saw the Hall-mark on the case, combined with the reputation of the seller and the price asked for the watch, the buyer, on entering a respectable London house, did not ask the question whether it was an English-made watch—he took it for granted, and really believed he was buying a genuine English watch, and that the question would be unnecessary. That was their complaint: they said these foreign watches, which were sold as English, were not so good: they were rougher, coarser finished, and not so durable, and for the prices they were sold at not really worth the money; they contended that the public were deceived, and that the placing of this mark upon foreign goods enabled them to be sold at a higher price than they were worth, which was a fraud on the public and an injury to the trade. They did not want anything that savoured of protection, but they did want as far as possible to prohibit and prevent fraud and dishonesty. They did not even want to hinder foreign watches coming into this country, but they would say to the foreigner, "Let your countryman be known by his coat; use your own Hall-mark—that denotes equal value to ours; send your watches into this country complete, and we will call that fair trading; but do not place your movements in our Hall-marked cases, to foist them upon the public as British manufactured goods." They contended that this mark had become a national trade mark, and they asked his Lordship to be good enough to give them his assistance by inserting in the Merchandise (Fraudulent Marking) Bill a clause re-affirming that mark as applied to watch cases as a national trade mark, and to say that no foreign-made movement should be sold in English Hall-marked cases, and that no case of foreign manufacture should be allowed to be Hall-marked in any assay office in Great Britain and Ireland. They did not wish this to be retrospective, but, as there was a date in the Hall-mark, that anyone selling a watch of this description bearing a later date than that fixed in the Bill, should be liable to a penalty. They asked this simply as a matter of right, truth and justice.

Mr. Hewitt stated that the trade had been located in Prescot upwards of 200 years. They had introduced steam machinery for making movements, and had adopted standard sizes, with interchangeable parts. The watch which Mr. Rowson's friend had bought he found was a fusee watch, of which Prescot had really had the monopoly, and was made in exact imitation, apparently, of the Prescot movement. The watch was made to wind to the left like an English lever, but the piece which made it look like an English fusee was really a dummy, and the inexperienced purchaser might easily be deceived. In the course of some further observations he said that numbers of people were carrying these spurious watches about in their pockets under the belief that they were English; and he concurred with and endorsed all that had been said by previous speakers.

Sir Albert Rollit, M.P., said they believed the causes of the present depression in the watch trade were not far to seek, and that they might be remedied by the proposals of the deputation. The English watchmaker was confident of his own work, and he did not in the slightest degree fear foreign competition. This was no question of free trade, fair trade or protection, but simply one of protection against injustice and fraud. No less than 37,000 watches were Hall-marked last year, which were fitted with foreign works, and which ultimately ran the risk, according to the report of the Select Committee of 1878, of being sold and dealt with fraudulently as English-made goods. The Select Committee in 1878 had established the facts on which his Lordship was asked to legislate. That Committee's report stated:—"The chief complaint against the operation of the existing law comes from the manufacturers of watches and watch cases. They have established by evidence that within the last few years a practice has sprung up, and is rapidly increasing, under which foreign-made watch cases are sent to this country to be marked with the British Hall-mark, and afterwards fitted with foreign movements, and are then not infrequently sold and dealt in as British-made watches." The practice of which they complained had largely increased. Eight years ago the practice was estimated at ten per cent.; it was now estimated at 29 per cent. What the trade asked was that the Government should take a proper view of the question and protect the public against fraud: the trade did not ask the Government to be generous to them in legislation, but simply to be just.

Mr. W. F. Lawrence, M.P., pointed out that at one time the Hall-mark was confined to the particular locality in which the goods were manufactured. *A fortiorari* American and Swiss goods ought not to be stamped in London, as in the old days the Hall-marks represented some local origin. The Swiss had their own Hall-mark, and as they were not content with that it showed they placed some value on the English Hall-mark, and it was most unwise that they should be allowed to come here and avail themselves of the English Hall-mark for the purpose of selling an inferior article.

Captain Penton, M.P., also urged the necessity of an amendment of the present system.

Mr. J. Rowlands, M.P., speaking as a practical watchmaker, and also as one having had experience in the trade as a watch dealer, bore testimony to the accuracy of the statements made by previous speakers, and concurred with their application for an amendment of the law.

Lord Stanley said he was anxious to get practical views, and asked if any other gentleman would like to speak on the subject?

Mr. Eagles stated that some time ago, when Mr. Chamberlain was President of the Board of Trade, he was interviewed on this subject, and he expressed his sympathy with them, and told them that if they found the practices growing to make a further application to the Board of Trade, which they now did.

Lord Stanley said he had listened with great attention and very great interest to what had been said, and he was obliged to them for the clear manner in which they had brought their views before him. Mr. Walker did all that was necessary to place the case straightforwardly before him, and he was much obliged to him and to other gentlemen for the various suggestions and remarks which had been made. One point he wished to refer to, and that was that they must deal with the matter, not with what people thought, but with what was the law. Two or three speakers had commented on the fact, which he did not doubt, that this mark had come to be looked upon as a national trade mark. It would be his business, in dealing with the subject, to take the case as the law now stood, and if he was correctly informed, provided the standard of quality was complied with, he did not understand that there was any optional power or any discretionary power left with the assay office to refuse an article tendered for Hall-marking. They must therefore put the question of Hall-marking to that extent aside—the assay offices had no discretionary power conceded to them. He thought there was much in the suggestion made by Mr. Walker, that when the mark was applied for a declaration should be handed in; but upon this point he should like to refresh his memory by a reference to Sir Henry Jackson's Bill. He was very glad to recognise what was the general feeling of the deputation of the trade in all parts of the country, that the movement was not one for protection against competition, but against fraud. That cleared the ground very much. There were several questions which he might conveniently ask now. One which would have to be considered was whether any suggestion was made that movements should in any way be Hall-marked?

A Delegate: What we want is that no foreign movement shall be allowed to be put into an English Hall-marked case.

Another Delegate: We do not require to have the movement marked.

Lord Stanley: Then the suggestion is that no foreign movement shall be put into an English Hall-marked case.

Mr. Walker: The English case maker is prevented from using a case that is not Hall-marked.

Mr. Newsome: But the foreigner is not.

Mr. Newman stated that until 1844 it was impossible to get foreign work Hall-marked. Up till that year the law read that the cases should be sent in by the "worker or maker;" but Mr. Prideaux, on behalf of Goldsmiths' Hall, obtained an alteration of those words to that of "dealer," meaning anyone who dealt in the articles, without the watch trade being informed of it.

Lord Stanley said, for the sake of argument, supposing it was found advisable to allow foreign movements to be placed in English Hall-marked cases, did they suggest that any distinctive addition should be put into the English Hall-mark, denoting the foreign movement, or did they think the purchaser would still continue to be deceived?

Mr. Walker pointed out that the purchaser, and even dealers, would continue to be deceived, as the letter F, for instance, could be easily filled up and obliterated, so as to defy anyone saying that it had ever been marked at all. No protection against fraud would be gained by such a mark.

Mr. Newsome pointed out also that from foreign cases that had been Hall-marked the dome had been removed, and a dome of base metal substituted. It had been said that when people went into shops to buy watches they did not ask whether they were English or foreign; but if the foreigner went to the expense of sending cases to this country, paying a dealer here for the registration and use of his name, and a commission on the cases for which the Hall-mark was obtained, and then the further expense of returning them from this country, he must reap an advantage somewhere—and the fraud was carried on largely in the foreign and colonial markets.

Sir A. Rollit remarked that the Select Committee found the letter F would not be sufficient.

Lord Stanley: I have very little to say on the general question, except that I agree with you in the desire to eliminate fraud, and that anything we can legitimately do in that direction of course it is our absolute duty to do. I shall consider very carefully the remarks you have made to-day, and the points that have been brought before my notice; and if in the course of legislation we find a means by which we can fairly deal with this matter without any undue interference with trade, I shall personally do my utmost to bring such a matter forward in connection with legislation. But this bears on a great many practical matters of detail; and I think I may ask you, as representing the general watch trade, kindly to be good enough to appoint out of your number some two or three gentlemen with whom I may place myself in communication. That will be attended with very great convenience, because there are practical points on which these matters turn, which will make all the difference between a good measure and a bad one. Appoint some two or three gentlemen who would fully represent your views on practical points, and my colleagues and I will be very glad to place ourselves in communication with them. We shall do the utmost we can to meet your views, consistently with our duty towards the trade of the country.

Mr. J. S. Dugdale, M.P., thanked his Lordship, on behalf of the deputation, for the courtesy and consideration with which they had been received, and the interview then terminated.

Mr. Walker was called up to the chair, and Lord Stanley, after thanking him for the clearness with which he had placed the matter before him, asked him to be good enough to act as one of the consulting committee, in conjunction with Mr. Rowlands, M.P., and Mr. Hewitt (Prescot).

Subsequently a meeting of the delegates was held at the office of Mr. Rowlands, when Mr. Rowson (Liverpool) was added to the consulting committee, who, it was decided, should act in conjunction with the respective trade associations.

Science and Art Department.—Professor Rücker, F.R.S., has been appointed by the Lord President of the Council to the Professorship of Physics in the Normal School of Science and Royal School of Mines, rendered vacant by the death of Professor Guthrie, F.R.S.

The Hall-marking of Watch Cases.

THE following letters were published in the *Daily News* of December 4 and 7 respectively:—

"Sir,—I hope you will allow me just a word as to the proposed deputation of watchmakers to the President of the Board of Trade. They wish him to believe that they deserve protection because watches of Swiss manufacture are sold with the English Hall-mark and bought under the impression that they are English. I know well that watch buyers never care a fig whether the stamp is English or Swiss—indeed, the Hall-mark of either country is equally good; and as to its being a test of the quality of the movement, we know that the very vilest English watches bear the same stamp as the finest that can be made. It is all bosh to declare that the public are deceived, when the real fact is that, for the price, the Swiss watches are better in quality and style, and that is the true reason why the preference is given to those of foreign manufacture.—Yours respectfully,

"John Bennett.

"65, Cheapside, E.C., *December* 3."

"Sir,—The letter you published on Saturday from Sir John Bennett is not a fair representation of the motives of the great majority of English watchmakers, who are trying to put a stop to the practice of placing an English official stamp on foreign-made watch cases.

"Sir John, in his characteristic style, informs us that 'watch buyers never care a fig whether the stamp is English or Swiss—indeed, the Hall-mark of either country is equally good.' The latter part of this statement is true; but, if the former is equally true, why do the Swiss manufacturers take the trouble and go to the extra expense of sending their cases to England to have them Hall-marked? Their objects are plain enough. A Swiss watch, made in the style of an English one, with the English Hall-mark in the case, will sell for more than a Swiss one with the marked character of a Swiss watch; and for the reason that so-called watchmakers can and do put their own and other English names on them and sell them at a much higher price than they could Swiss watches of the same quality on their merit. Sir John knows this as well as I do. English watchmakers do not want protection, but they want to put a stop to a practice they consider dishonest and injurious to both their trade and reputation—a practice which has never received the sanction of Parliament, but has been brought about by the repeal or alteration of certain laws whose bearing on this question had not been foreseen. The practice has not been confined to watches intended for sale in this country only, as these imitations of English watches are extensively sold for the real thing in countries where English watches have made a name, and where 'preference is *not* given to those of foreign manufacture' (Sir John Bennett's opinion notwithstanding). The traffic in these goods is a business that benefits no honest man, and I have the authority for stating that the Goldsmiths' Co. look upon it with disfavour, and have no desire for its continuance.—I am, yours, &c.,

"David Glasgow,

"Vice-President, British Horological Institute."

Recent advices from Sydney, N.S.W., state that it is the intention of the New South Wales Government to submit to Parliament next month a proposal to hold an Inter-Colonial Exhibition, to form part of the centenary celebration in January, 1888; but it is suggested that the idea should be expanded so as to provide for the participation of the mother country and all the colonies and dependencies of the empire. This latter proposition is, however, a matter for future consideration. It is understood that, acting on the request of the Government, Lord Carrington, the Governor, has forwarded an invitation to the Prince and Princess of Wales to be present and to open the Exhibition.

Mr. Mundella's Merchandise Marks Bill.

MR. MUNDELLA, speaking at Sheffield on November 30, on the subject of trade depression and the means of bettering the relations between employers and workmen, went on to refer to the question of trade marks. He said: A short time before he spoke to the French Minister of Commerce, with whom, when he was President of the Board of Trade, he was on good terms, on the subject of false marking, and he told him that we were very anxious in England to honestly mark all our goods. What they wanted was international honesty as well as local honesty, and he hoped the Minister would support us as he had supported us at the convention in Rome. The Minister spoke out in a very manly manner, denounced false marking as organised robbery, and said he would do all he could to put an end to it. There was now a Bill before the French Chamber for putting it down, and for confiscating falsely marked goods throughout France. That was what they wanted to see done everywhere, because when he took this matter up at the beginning of the year there were three things they wanted to accomplish. One was that the other Powers would adopt the same policy with respect to marking as we advocated ourselves. That they had succeeded in doing. They had secured the concert of Europe on this question. Now they must make our laws at home to harmonise with the resolutions which they had agreed to abroad. That object he had embodied in his Merchandise Marks Bill, which he hoped would pass into law next session. The next point was to get foreign Powers to legislate in the same direction as we legislate ourselves. That France was doing; and he hoped every other nation would do the same—until the spirit of honest dealing would pervade all Europe, the United States and our colonies; and that the man who is not content to rest upon his own honest name and mark would have but little chance of selling his fraudulently marked goods in any market in the world.

Industrial Villages.

ON the invitation of the members of the Social Science Club in Oxford University, the Rev. Henry Solly, Chairman of the Society for Promoting Industrial Villages, delivered an address, on December 8, at a private meeting held at Exeter College. Mr. Sidney Ball, fellow of St. John's College, occupied the chair. During the last two years considerable attention has been drawn to Mr. Solly's method of relieving the overcrowded condition of our large towns. On Wednesday evening Mr. Solly sought rather to provoke discussion as to the difficulties of his scheme, and to set before the meeting some of the methods of approximating to his ideal, than to give an account of the probable condition of things when the difficulties have been surmounted. The founding of these industrial villages is intended to decentralise the manufactures of the country, and to put a stop to the continual influx of the population of the rural districts into the large towns, by providing useful and necessary employment in small, organised village communities, and by supplying in these villages wholesome means of recreation, to satisfy the rational and just demand of men for amusement. Mr. Solly justified his scheme by pointing out the evil effects, physical, intellectual and moral, which are the natural outcome of the existing state of things. He showed the practicability of carrying on in the country districts such industries as printing, collar and necktie making, knitting, lacemaking, watch manufacturing, bee culture, &c., by adducing several instances of the successful working of these things; and, in conclusion, indicated some of the immediate methods by which the Society for Promoting Industrial Villages is seeking to attain the objects of its existence. A long and interesting discussion followed.

THE second annual meeting of the Society for Promoting Industrial Villages was held on December 10, at the Society of Arts: the president, Sir George Campbell, M.P., occupying the chair. Upon the platform were: Mr. J. M. Maclean, M.P., the Rev. Henry Solly, Professor Hudson, the Rev. H. V. Moyle, and other gentlemen. The report of the honorary secretary pointed out that the society originated in the exposure of the deplorable evils which were so forcibly brought to light and only too truthfully described in "Horrible London," and in the evidence before the Royal Commission on the Housing of the Poor. The excitement caused by these appalling revelations soon died away, without leading to any sustained and effectual action for preventing the evils thus disclosed. The members of the society were convinced, by long and extensive observation, that the measures they proposed would to a large extent be effectual in securing healthier and happier conditions of industrial life than were at present found in this country. The tendency at present was to concentrate industrial employment in towns, and all arrangements were made in accordance with this. The society sought to reverse this tendency. Their hope was to establish as a principle the carrying on of manufacturing industry in the immediate neighbourhood of agricultural districts. They found that there were various localities anxious to welcome new or revived industries, and, in spite of the conservative nature of capital, they were more firmly convinced than ever that their scheme was practicable, and that there was no other way to stem the tide of destitution and poverty. Resolutions in support of the objects of the society having been carried, the president, vice-presidents, and members of the council were re-elected.

Is Machinery a Benefit to Labour?

THE following letter appeared in the American *Jewellers' Circular* (December number). As the question as to what is to be the future of the English watch trade is just now exciting so much conjecture, we reproduce it, as it throws a light on the subject from a point of view that is often too little considered.

"I read with much interest, in the November issue of your magazine, an article headed 'Machinery a Benefit to Labour.' I have read other articles of the same purport from time to time, the idea conveyed being that the introduction of machinery to do certain kinds of work so cheapened the cost of the product as to create an increased demand for that product, and that while a few men could, with the machinery, do the work of many, yet the increased consumption of the articles manufactured rendered the employment of more men necessary. Let us grant, for the sake of argument, that the introduction of machinery gives employment to more men, it is by no means a logical sequence that machinery is a benefit to labour. I contend that it is the main cause of the scarcity of skilled workmen in almost every line of trade. Instead of having good all-round workmen, we have now little else than specialists, men who have been taught to superintend machinery employed in making some one thing—a part of a watch, for instance—and who know how to do that one thing well, but nothing else. Take away from them the machinery and they would be unable to produce even a sample of their specialty. We have comparatively few watchmakers now for the reason that watches are made by machinery, and hand-made watches are seldom seen in the market. I had some experience in this line myself. I went into a watch factory to learn the trade of watchmaking, as I supposed. After a short time I was placed in charge of a machine for turning pinions, and there I stuck for months. I learned all about that machine, and became expert in running it, but I never got beyond it. I found men in the factory who had been doing that kind of thing for years without any advancement or hope of any; in fact, they did not desire any—they were satisfied with what they earned, or circumstances compelled them to be content with their lot, and so they worked along, year in and year out, at the same old routine, never advancing one iota in their knowledge of watchmaking. It was not necessary for me to be that kind of a drudge—part of a machine, in fact—and after a few months, despairing of improving my condition in the factory, I left and found employment with a watch repairer, and there I learned the trade of watchmaking.

"In the jewellery business the same thing is found, and so indeed in almost every other trade—machinery is doing the work of the men, and apprentices have no opportunity to learn trades. For this reason, trained and skilled mechanics are becoming scarce.

"In one other phase machinery is no friend to labour, and that is in the question of wages. As a tender to a machine, a man may get 2 dollars a day, when, if he were a skilled mechanic, master of his trade, he would be worth twice or thrice as much. Machinery may give employment to a greater number of cheap men, but it does not make workmen, nor does it fairly remunerate those who serve it. The fact that attending a machine is mechanical work opens that field to cheap and unintelligent labour at the expense of brains and skill. Possibly the fact that it gives employment to so many more persons may compensate in the long run for these drawbacks, but in individual cases machinery cannot but be regarded as an obstacle in the way of their advancement.

"Workman."

Postage Stamps.

The Paris correspondent of the *Daily News*, in an interesting article under the above heading, says:—

"An overwhelming correspondence has been forwarded to me on the subject of postage stamps, about which a very short telegram appeared in your issue of 8th ult. The announcement that a dealer had offered £4 15s. for a Tuscan stamp prior to 1860 created quite a flurry in the English stamp-collecting, or, as adepts say, philatelical, community, and offers by letter and by telegram have kept pouring in to me from all sides by every mail asking for further knowledge. I regret that I am unable to return individual replies to these applications, and trust that such information as I have collected will enable my correspondents to act for themselves. Unfortunately, I have been disappointed to a certain extent in the Tuscan stamp. The extraordinary offer for them was made by a M. Hardouin, styling himself a large postage stamp dealer, in a letter to the papers, but I have been able to find out nothing about him through the usual channels. For some extremely interesting information, however, I am indebted to the well-known dealer here, M. Maury. He tells me that most of the old Tuscan stamps which were alluded to were plentiful, being sold by him from 25 centimes to 1 fc. 50 c. each, according to the colour. Now, the 60-crazie stamp, brick-red, with a lion's figure, is excessively scarce, and M. Maury is open to buy it for £6. The 3-lire, yellow, with the lion's head, of 1860, would be paid £8 to £16 by him. It should be remembered that the value of the stamp varies within a very wide limit according to the perfection of the example, and, with one or two exceptions, new stamps are worth ever so much more than old ones. Here are a few prices which M. Maury is ready to pay for some of the very scarce stamps:—Old Brazilians, with slanting figures, 180, 300 and 600 reis, black, from 16s. to £2 each; Buenos Ayres, with a ship, £3; peso, green, from £2 to £4; 4-peso, red, from £4 to £6; and 5-peso, yellow, from £2 to £4. Cabul stamps, although of recent date, viz., 1870-75, are, as a rule, expensive, ranging from 8s. to £4; and when a 'V' and a 'R' are engraved at the top angles, it becomes worth £6 at the dealer's buying price. It appears that this stamp was used only on Her Majesty's service. The round British Guayana stamps of 1850 are worth £2, £5 and £16, &c., according to their colour. They are extremely coarse woodcuts, on paper of different colour, and resemble post marks for cancelling. Some of the 1851 issue fetch from £2 to £4. But the rarest is the 4-c. stamp of 1856, black on blue, for which M. Maury will give about £40. The *rares aves* are the two first Mauritius stamps, of 1847, with Queen Victoria's head, for which £80 to £120 are offered. These are by far the most expensive stamps in the world. Round Moldavias, of 1858, with an ox's head, are worth from £4 to £16, according to the colour. A Naples stamp, of 1850, ½ T blue, is estimated from £5 to £12, and the same, with a Savoy cross, from 12s. to 23s. only. The 1859 stamps, with Ferdinand II.'s effigy, were few; M. Maury, however, has bought a stock that was hidden away when the Italian troops entered Naples, and now they are worth from 5d. to 10d. The old French Republic stamps, of 1849, are within easy reach: 20 c., black, 1d.; 25 c., blue, ½d.; 40 c., orange, 7½d.; 1 franc, crimson, 7½d. The expensive ones are £8 each. They are of round shape, representing a very roughly sketched tiger's head. These stamps were usually cancelled by a part of them being cut off on the envelope. As regards Spain, the rarest are 2 reals, of 1851, from £10 to £12; 2 reals, 1852, from £6 to £8; 2 reals, 1853, £6 to £8; 3 centimes, bronze coloured, with the figure of a bear, for letters within Madrid only, 1853, from £2 8s. to £4. Don Carlos, although he never minted money, has, it appears, stamps with his effigy. They were some years ago of the scarcest, but large quantities of them have since been found. The prices now offered for them range from 2½d. to 10d. Old United States have risen enormously of late in the market, because the Government, which was willing enough formerly to sell the old withdrawn marks to collectors, has been so bored with applications that it has destroyed the sheets and dies. But still more expensive is the complete issue of newspaper stamps for 1875, and M. Maury offers to pay £40 for the nine highest together. In England, the celebrated Mulready envelopes are becoming scarce, and from 8s. to £1 is offered. The black 1d. stamp of the same date, which is commonly thought to be excessively rare, is only worth 1d.; but a 15 c., green, only when new, is worth £1 12s.; 1 fc., vermilion, £2 old and £4 new. Philippine Islands, of 1854 and 1855, very remarkable engravings with Queen Isabella's effigy, £1 4s., £4 or £100, as the colour is. For Reunion Isle, no price is given, but some time ago M. Maury offered for sale in the *Collectionneur de Timbres Poste* newspaper a couple of these stamps of 15 and 30 centimes, bearing the post mark of 'St. Paul, Any. 22, 1852,' and 'St. Pierre, Any. 2, 1852,' respectively for £100. They were disposed of within a fortnight."

Presentation to a Liberal Candidate.—On December 3, Mr. E. B. Barnard, of Fair Green, Sawbridgeworth, was waited on by a deputation of Liberal electors from the Epping Division of Essex, who presented him with a silver epergne, manufactured expressly by Messrs. Benson & Co., of Ludgate Hill, as a memento of his services on behalf of Liberalism in December, 1885, when he unsuccessfully contested the seat against Sir Henry Selwyn Ibbetson, Bart., M.P. The Rev. F. Edwards made the presentation, and said 500 working men were amongst the subscribers. Mr. Barnard afterwards entertained his friends at luncheon.

A case heard at the Marylebone Police Court, on the 8th ult., has brought to light the fact that a number of diamonds have been pawned at different times in the past year which, being of an inferior quality, have, by a certain chemical treatment, the exact nature of which is not perfectly known, been made to resemble fine stones. By some application of a neutral tint to the back of the stone, the yellowness—which is so great a disparagement of its worth—has been counteracted and a degree of whiteness and increased brilliancy has been added to it. Specimens of these "painted" stones have been submitted to the Committee of the Pawnbrokers' Protection Society, which reports that their appearance is magnificent. The dye, or whatever it may be, is soluble in spirits of wine, after the proper application of which the diamonds return to their yellow tint. From the evidence of experts engaged in the inquiry, it appears that by daylight the deception is perfect, but that by gaslight certain suspicious indications are observable. As far as has transpired up to the present, the practice of this deception has been confined to the pawnbrokers, who are naturally not a little interested in the subject.

The Grave of an Etruscan Lady.

ONE of the most important excavations of modern days was made at the end of November and the beginning of last month; in fact, the interest it has excited has not been surpassed in Umbria since the life-size bronze statue of Mars, in helmet and full armour, now in the Vatican Museum, was unearthed 45 years ago.

The present excavation is at the burial-place of a noble Etruscan lady, a few paces outside the Porta Fratta. Numerous fragments of pottery, &c., found near led the brothers Orsini, to whom the land belongs, to search with care for any relics of value. To this care is owed the remarkable state of completeness in which the gold, bronze and terra-cotta ornaments have been taken from the earth overwhelming a case of wood that had enclosed the remains of the body of a woman of rank—perhaps, as it has been suggested, that of a priestess. The wooden case had entirely perished from lapse of time, leaving only the clasps and beaked decorations to show its former existence. Hopes are entertained that the written characters, some fourteen or fifteen in number, inscribed on the face of an immense gold ring, may provide a key to the name or dignity of the lady. The style of the vases and bronzes points to a period about 600 years before the Christian era. The cranium of the lady is placed among the rest of the treasures found, and has the usual very low forehead of the Etruscan type. The ear-pendants, between 4 in. and 5 in. in length, are larger than any hitherto discovered, except, perhaps, a pair in the British and another pair in the Perugia Museum; they have upon them a female head, and three delicate chains suspending tassels, all of fine gold.

The objects worthy of special mention are the following:—A tripod used for burning perfumes, supported on three winged female figures in various attitudes, all with arms extended before them, except one, who places her left hand on her head. Above, upon a circle or wheel ornamented with four inverted *fleurs de lis*, stands a long-tailed Satyr, with head erect, apparently washing in a round dish two nondescript balls, which he is rolling up and down; his legs are stretched wide apart on two edges of the wheel. Half way up the stem is another winged female, and surmounting the whole is a square reservoir for the perfumes or unguents, bearing on each angle a swan in repose. Next comes a statuette of Bacchus, standing, inclined in an easy attitude, with legs crossed in a fashion which recalls the celebrated marble Faun at Rome; another Bacchus, supporting on his head a long and empty basket, with, over it, an ornamented shell; a curious little owl, which served as pinnacle to a broken bronze vessel found near the place where would lie the feet of the lady; and a most beautifully shapen small terra-cotta vase of Greek appearance, with a male and a female head back to back on the top. A mirror, probably held in the right hand, was found behind the shoulder. A long ivory instrument with a handle elaborately and tastefully carved with a ram's head; a purple-and-white glass scent-bottle; and two single-handled vases in terra-cotta were also found. The golden ornaments are very numerous. First is the abovenamed massive signet ring, which has two full-length figures impressed on it, and a star over all. The written word thereupon may, if it can be read, reveal to history what manner of woman she was whose grave is rifled to minister to our curiosity. The letters are quite distinct and clear. There are also a brooch adorned with a female head; a beautiful medallion with an onyx stone centre; a plain gold ring, rather broader than a modern English lady's wedding ring; another ring with an onyx stone revolving on a pivot; a pair of small close-fitting earrings; a triple chain of gold, in pattern like the Genoese filigree work, which was attached to the above medallion; twenty large gold buttons, half of them ornamented with a head and the rest with a star; 200 pieces of gold in equal-sized fragments which had formed a long chain, and broken loose from the filament on which they were strung, and a quantity of garniture in the same precious metal which had been sewn on the lady's apparel.

Watch Jobbing.

By X. O. N.

(Continued from page 133.)

A GOOD watch is not safe in the hands of a workman who is either careless or unacquainted—as many are—with the very rudiments of the trade they profess. There is now no excuse for this prevalent and increasing ignorance, considering the number of text books and other sources of information available to anyone anxious or even willing to learn. It is really grievous to see the number of good watches that are spoiled by jobbers who neither understand what they profess to do, nor could do it if they understood.

I have tried to impress any watch jobber who may take sufficient interest to read these papers with the absolute necessity of acquiring sufficient manipulative skill to enable him to handle good work with care and confidence, and not to trust to such appliances as these much-praised machine tools. The need of this advice may be illustrated by recounting two cases that have lately come under my own observation. A gentleman gave his watch (a high-class fusee watch) to a neighbour, a watchmaker and jeweller, in a leading thoroughfare in the City. The watch had stopped, and was *sent out*, of course. It came into my hands a very short time afterwards, when I found a new mainspring had been put in; a hole had been drilled close to the square hole in the barrel, and a brass pin screwed into it for a hook for the mainspring. The spring—a common foreign one—was so thick that it only gave the barrel three turns and a half in unwinding.

Case No. 2: A good watch was put into the hands of a watchmaker and jeweller, also in a leading City thoroughfare. This watch had a fall, and the operator wanted to find the cause of the watch stopping without the trouble of taking it to pieces; he therefore experimented on the banking pins, bending them until they nearly touched the plate; but, as this did not mend matters, he cut the pins away from the inside until the impulse pin came against the side of the lever fork; and, in the operation, hacked the plate of a really fine watch with a knife or chisel.

To some it will seem too elementary and even useless to give any directions how to make pivots; but, judging from the attempts one meets with of pivot making, there must be a good deal of ignorance on this subject also.

To the ordinary country watchmaker's apprentice the power of pivot making would come easily if he had learned clockmaking; but now that art is dead in the country towns, the youth learns his trade with clean hands. In the everyday practice of watch repairing, it is true, making pivots is an exceptional piece of work, as, if a cylinder or its pivots are broken, or even the pivots of a lever watch, the cheap carriage of parcels enables the works to be sent to London, where the universal provider, the tool-shop keeper, gets over the difficulty by sending the job to a specialist, while the apprentice, or, for that matter, the journeyman, dreams of some day possessing the "Jacot," or some other of the various tools that are so extensively advertised to do any piece of work without the necessity of any skill or knowledge in the operator.

It would not be fair, however, to blame the youth who thus allows the years most appropriate to learning the most useful part of his art to pass away without his doing so, as the doctrine of the waste of energy in acquiring skill in mere finger work is so eloquently preached by our reforming prophets. For pivot making the best gravers are necessary; and for making the best gravers the best and finest grained cast-steel is necessary. Both English and Swiss gravers for general purposes can be bought at the tool-shops; but for special purposes, such as cutting the hollows in the back or face of a pinion, watch finishers make their own. The black steel is usually better for this purpose than the bright drawn steel, as it contains more carbon and will harden at a lower heat. Engravers always temper their tools; but for turning steel, gravers must be left hard, and they should acquire the right temper in dipping, as, if they are made too hot in hardening, they will be brittle even after the temper is drawn.

The steel should not be heated to more than a blood colour, and should then be dipped in oil.

The angle at which the face of a graver is made will have much to do with it keeping an edge, and also with the liability of the point to break off, which is a constant source of trouble to beginners. If the point is long it will be constantly breaking, requiring application to a grindstone to get it to its former shape: and a grindstone is a machine that should never be used for sharpening a watchmaker's gravers. Sharpening or whetting gravers is an art seldom learned by watch jobbers, but to which great attention is paid in fixed cutting tools used in automatic machines. There is no fixed rule for the angle of a graver, but the point should not be long. It is generally thought a waste of time to have too frequent recourse to the oilstone; but it is a mistake to work too long with a graver with the idea of saving time, as, if the oilstone is flat and clean with plenty of oil on it, a few rubs will bring up the edge if it is only a little dull, but if it is worked with until it is blunt, it will require a corresponding time to restore it: and this is why a good many men never have their gravers a proper shape. The face of the graver should be quite flat, and the edge obtained by rubbing the face only, and not by getting up the edge from the back; the back squares being drawn over the stone to take off the burr or feather-edge. A fast cutting Turkey stone would leave too coarse an edge on a graver for making small pivots, therefore a good Arkansas stone is preferable for keeping a good edge on a tool.

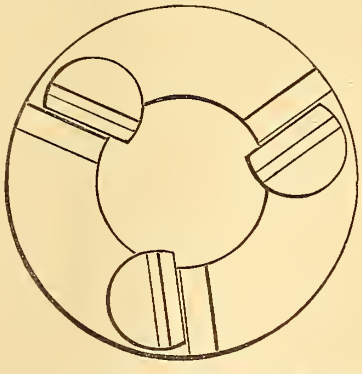
The next thing necessary is to see that the turns are in proper order, that the runners fit well and are easily fixed, and that the centres for the pivots to run in are as deep as possible. The height of the rest must be carefully looked to, but the height at which to fit it will be governed by the size of the graver used. The rest should be close to the work, and at such a height that the edge of the tool will be opposite the centre of the piece turned, as, if it is higher than the centre, it will not cut freely, and if below, the risk of breaking either the tool or the pivot will be much increased. Pivots should be turned to very nearly the required size with the graver, and, if it be a pivot with a shoulder, the pivot made quite straight and the shoulder square before using the polisher, as a little lump in the corner can only be got out with a polisher by a very practised hand. Hard hammered black steel is best for polishers, which, for small pivots, should not be large. The polisher may be oblong or square. The first is the best form, with the edge next the shoulder sloped off at such an angle that the edge of the polisher will always get to the corner of the pivot and shoulder. This side of the polisher may be straight or a little convex, and both face and edge of the polisher kept sharp by repeated filing up with a sharp but not a coarse file, as using a polisher until it is quite smooth only puts the work out of shape and rounds the shoulder.

There are many different opinions as to what is the best metal for polishers, and, as polishing is an art, the opinions may be all right; but the general principle may be taken as true, that the article polished must be harder than the polisher: but how much harder will depend on the article polished. If a piece of hard steel with a large flat surface is to be polished, diamantine would now be used to finish with on a block, or with a polisher of zinc or some compound of zinc and tin. I think pure tin is preferable, as any admixture of tin with the zinc makes the block too soft, and the work will be easily rounded, although, if a very little diamantine is used, a very few rubs will complete the polishing, and need not round the work if it has already been flat and square. But polishers for small surfaces such as pivots cannot be made of metal as soft as zinc, as they would soon lose their shape and spoil the shape of the pivot; therefore, some men use bell-metal and others brass polishers for small pivots, and depend on the burnisher for the ultimate finish.

Success in polishing also depends much on the mode of mixing and using the polishing stuff. Oilstone dust is often employed, but, in my opinion, it should never be used by watchmakers. It is very dirty, and it is impossible to make anything flat with oilstone dust and a steel polisher. Watch finishers used to be fond of preparing their work for gilding with steel polishers and oilstone dust, but you only had to rub a flat stone over the piece to see how uneven the surface was.

Good coarse red or sharp stuff cuts very quickly, if used properly with a hard, sharp steel polisher, and should be prepared like all other polishing stuffs on a hard steel block. The blocks set in round boxwood boxes are better than the square ones in tin cases, as the lid to the wooden ones fits better and excludes the air and dust. It is unwise to mix too much at a time, as, if the oil gets even a little thick, the stuff is useless. When it is mixed with oil, it should be well beaten up with a burnisher, kept for this purpose, until it is quite smooth and of the consistency of paste. In mixing fine red stuff, the dust may be thrown away and the small lumps only used, as any dust mixed with it will scratch the work; this must be well beaten with the burnisher until it is quite smooth, and left a little thicker than the sharp stuff. Diamantine requires even more care and cleanliness than the red stuffs, and as the grains are sharper, it must be beaten until it is very smooth, and used a little thicker than the red stuffs as the smallest quantity only will polish; if too much is put on the polisher, it cuts quickly but will not polish. There is a prejudice against using diamantine for polishing pivots, as it is thought some of the sharp grains get imbedded in the metal, and afterwards cut the holes or pivots; if this is so, the diamond powder, used by watch jewellers to polish the jewel holes with, would have even a worse effect, but in practice we hear nothing of it. However, fine red stuff used on a brass or bell-metal polisher will bring a pivot up very smooth, and a burnisher is generally used to finish with; but burnishing a pivot is a process that must be very carefully performed, and a burnisher used that will not scratch the shoulder. A conical pivot is more easily made than a straight pivot with a shoulder, and like it should be brought to the required size, that is, the point should just stick in the hole before the polisher is used. There is also a difference of opinion as to the proper shape of a polisher for conical pivots. Some escapement makers make the polisher quite straight, rounding off the corner to the shape of the pivot all the length that is used; some prefer a taper polisher, as some part of it comes in contact with the pivot while passing over it, and therefore polishes it in the shape it has been left from the graver—this will be seen by using a small oval burnisher to finish the pivot with. There is no part of a watch jobber's work that requires so much constant attention as the pivots of the balance staffs, either from the watch having had a blow or a fall; or, very often, from the balance having been put into the frame carelessly, the end of the pivot will have become flattened or will have a burr thrown up on one side of it, which, although it may not be sufficient to stop the watch, will certainly prevent anything like good timekeeping.

If this injury has been done to the bottom pivot of an ordinary full-plate watch with a gold or steel balance, in most cases there is no room to fix a screw ferrule on the end of the staff; so the injured pivot is passed over with a hope that it will do, to save the trouble of sticking a wax ferrule on the three-armed balance, which is both troublesome and uncertain as to the time it will remain there.



To get rid of this wax ferrule, I made a brass one for the purpose, which I have found very useful, a drawing of which is here given. It is a very simple affair: a brass disc the size of an ordinary ferrule used for this purpose, with a deep groove for the bowspring or hair, to prevent it slipping off. The inside of the disc is cut away and a rim left wide enough to take three dog screws; the rim is divided into three, and, at each division, a radial nick is made with a square file, not deep, and the screws are tapped into the rim close to the nick, as seen in the drawing; the insides of the screw-heads are tapered to enable the ferrule to be used with balances with arms of different thicknesses. This ferrule is put on or removed in a few seconds, and leaves no wax sticking to the balance, which is often more trouble to remove than it is to repair the pivot.

It is not too much to say that 40 per cent. of watches that are left for repairs have the balance pivots injured; at least, there is quite that proportion of them that would be improved by having these pivots touched up and burnished. A pair of brass runners should be fitted to the turns, and kept for this purpose only: the right-hand runner having a series of small holes drilled in its one end, on face, to fit various sized pivots as near the circumference as may be, the runner being turned away at the back of these holes sufficiently to give room for operating on the ends of the pivots; on the other end of this runner a series of facets is made, with nicks in the middle of them, as beds for the different sized pivots; on the left-hand runner an eccentric point is made, and a centre made in the point to correspond with the pivot beds in the right-hand runner. A very small flat burnisher, with one of the corners rounded off, is easily made, and should be kept for burnishing pivots. If the injured pivot is put in the bed in the turns, and the burnisher applied to the straight part of the pivot, then the runner reversed and the end of the pivot rounded, it will be found that a burr has been thrown up on the corner, which must be removed and the operation of burnishing the side and end of the pivot gone through again. Nothing but a burnisher should be used in repairing pivots that are damaged in this way, as if a file or slip of oilstone is used, you are likely to spoil the pivot; but the burnisher should be kept sharp and constantly rubbed on the emery board, which is the usual thing to rub a burnisher on; but a lead block with a planed surface is much better, as it keeps the burnisher flatter and smoother, and a burnisher rubbed on the lead cuts as fast as one with a coarser surface.

(To be continued.)

The Edinburgh Exhibition Awards.—It seems that the exhibitors at the late Edinburgh International Exhibition are to receive, instead of the gold, silver or bronze medals they have been awarded, representations of these awards on paper diplomas only. It is stated that the cost of coining the medals would amount to £4,000, and the promoters of the Exhibition do not see their way to expend this sum.

Sheik Hassoun Bin Jaffer, Master of the Horse to the Sultan of Muscat, who came to this country in charge of the Arab horses presented by the Sultan to the Queen, had an interview, at the India Office, on December 1, with Viscount Cross and Sir Henry Ponsonby (on behalf of the Queen), and was presented with a gold watch, chain and compass, and was shown the presents intended for the Sultan, which comprise a handsome gold repeater and chain, hall clock, tea service for the ladies of the Sultan's household, guns, &c., and gold watches for his sons.

Invasion of Paris.—A correspondent of *The World* writes: "One thing has struck me in my afternoon ramblings, and that is the invasion of the domain of the *article de Paris* by the foreigners, and particularly by the English and the Germans. On the Boulevard and in the Rue de la Paix the best morocco leather goods are English or German; the newest and quaintest nicknacks are not the French; the most fashionable silver plate is English; the largest stock of toys and dolls is English and German; the fashionable tailors are English or Scotch; half the perfumery shops are English; even the bonbon business is falling into the hands of the English; and Christmas cards are in every stationer's shop."

Birmingham News.

From Our Correspondent.

After weary waiting we may confess ourselves at last to be busy, and that there is a fair prospect of a fulfilment of the promises which have so long floated about, but which, up to the present, have been very will-o'-the-wispish and tantalising—now buoying us up with strong hope, and then disheartening by the discovery of their hollowness. We often hear of farmers praying either for rain or sunshine, and marvel at the importunity of their petitions; we have heard, too, of thanksgiving on account of gifts to come, but we fear the Birmingham jeweller has forgotten to return thanks for his season of blessing, although his prayers were very sincere and frequent a little time back; perhaps this will move him to a more grateful spirit. Possibly he considers himself shabbily treated, and the present *blow* but a poor reward for the protracted calm from which he has just emerged. *The Watchmaker, Jeweller and Silversmith* has certainly done its best to inculcate lessons of self-denial, and to foster a spirit of patience amongst its many readers; and now that the trade wind is briskly blowing in Birmingham, will, I am sure, rejoice and wish the jewellery manufacturers a long continuance of their present activity. Your readers must not, however, take it for granted, after the perusal of the foregoing, that there is no room for fresh orders, or that the present output is the utmost we are capable of: there is, in reality, no limit to our powers in this respect, or our appetite for orders, the present produce being capable of an infinitely greater expansion; and although busy, no strain is experienced, and no new hands employed, the present staff in the different factories being equal to the demand—a chance being given to the old hands to recover themselves by allowing them to work overtime.

* * *

If other branches of trade are affected in like manner with the jewellery trade by the approaching Jubilee, then it will prove an almost universal blessing. It is perfectly astonishing the amount of work of every description of jewellery there is in hand, and much of it in fine gold and of best work. I suppose there has never been a celebration, national or otherwise, which has so largely benefited the trade; and, unlike the Primrose League anniversary, I believe every article made is only made to order, so that manufacturers, at any rate, will have no surplus and unsaleable stock to melt up at a loss. Amongst the many patterns the chain bracelet will find many admirers, it being made to use as a lady's albert as well as a bracelet. Brooches are in, perhaps, greater demand than anything else. It is only natural, of course, that the women of England—bless them!—should be filled with patriotic zeal when one of their sex has reigned uninterruptedly for 50 years, and there are many reasons why it should find expression in the purchase of appropriate jewellery.

* * *

With reference to the Toronto house (Messrs. Rothschild & Co.) mentioned in my last month's "News," I learn, on good authority, that 5s. in the pound has been offered. The Birmingham creditors, generally, are in favour of its acceptance, but several Sheffield houses withhold their consent. I am safe in saying that, unless they agree pretty quickly, they will not get more than 1s.

* * *

Providing orders continue to flow in for general work after the completion of the Jubilee orders, we may fairly anticipate a good and profitable season for the first quarter of the New Year; but, failing this, we must prepare ourselves for a return of the depression, although not so severe as that from which we have just escaped.

* * *

A last word in reference to the Birmingham Exhibition. At the final meeting of the local Executive Committee, held a few days ago, the reports were received from the Exhibition Sub-Committee and from the local officers, from which it appeared that the Exhibition yielded a surplus of £5,200. After defraying out of this sum all expenses connected with the meeting of the Association in Birmingham, there remained an available surplus of £1,311 15s. The officers recommended that this sum should be devoted to the purchase of a collection of Illustrations of Art in Birmingham Metal-work, exhibited at Bingley Hall, to be placed in the Museum and Art Gallery, and that a select committee should be appointed to make the necessary purchases. The recommendation was approved.

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The electro-plate makers are in full swing, and have considerably increased their sales during the past month.

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Silversmiths are recovering themselves and find that, although agricultural pursuits are ruinous to those engaged in them, that there is still life as well as a love for plate in the counties.

* * *

It is said, and believed by many, that the watch trade is leaving the country—that it is on its last legs. The suggestion is a foolish one, suitable to the credulous minds of loose observers, fostered by the importers and supporters of the Geneva watch trade with a view to delude the British public into purchasing their cheap goods. The recent movement of manufacturers will possibly educate even *them* into the conviction that English watchmakers are determined to secure the action of the Government in the suppression of foreign frauds. English levers are being offered now at an exceedingly low price, and it remains with shopkeepers and factors to sell them at a reasonable figure. If they will only put up with a profit about equal to that obtained upon American goods, the demand for English watches would speedily double itself, and, finally, oust the foreign work altogether. In the Colonies our manufacturers experience an increasing support, and large parcels are rapidly disposed of. Just now I hear of inquiries for large quantities, and, what is more pleasing, the great satisfaction which past consignments have given: this proves my statements in previous reports, that the quality has not deteriorated with the fall in price. We were almost going into mourning for the gold chain trade, but, like many other invalids, it has had a turn for the better, and, with care, may grow into a healthy branch again.

Diamonds.

The universal use of the diamond in all ages for purposes of adornment, and the wide-spread uses it is put to in working other stones and metals; the superstitions formerly attached to it, in common with all the other precious stones; modern chemical experiments to determine its qualities and origin, and the uncertainty which even now exists as to the last; render it a never-ceasing object of interest from whatever point it is considered. An abstract from a short article on the subject recently published in a contemporary will, therefore, not be out of place.

Diamonds have been objects of interest both to the ancients as well as they are at present to all classes, but more especially to scientists and savants, to whom, even up to this present age, they are a mystery as to their origin or formation. Though known to be composed of pure carbon, Pliny, as well as other ancient writers, seems to have been ignorant as to their characteristics, being imbued with more superstitious ideas than a true practical knowledge or estimate of their powers of resistance, believing they could only be crushed by a previous bath of goat's blood. Persians give special veneration to the diamond, owing to their belief that they fell from the heavens at the earliest creation of the world. Others attribute them to be of celestial origin, as aerolites, possessing electric light; others, again, believe them of vegetable origin, as some are found with water cavities, also vegetable as well as animal matter embedded in them. Workers in them seem to have a more true and practical knowledge of them, and feel convinced they are more of a volcanic origin, and their surmises may be correct, by the recent discovery in South Africa, where most of the supply is derived from the bed or mouth of an exhausted crater. Also in the discovery, within the past half century, of its sister morphonic gem, called 'carbonato,' which to an inexperienced eye (in some stages of its formation) has the outward appearance of crystals of emery, and when broken looks like fractured hardened steel; again, in other stages the appearance of porous lava; but even to the worker, as well as the scientist, their progressive age of formation still remains a mystery. It is impossible to say whether the above is an old or young diamond, being an opaque combination of minute grey crystals, compressed together by some natural force into such a dense form and temper as to make its sister lamellar and transparent gem subject to its attrition; and an invaluable adjunct in the mechanical arts. Again, we see the diamond in its transition state of formation from carbonato to that of granular lamellar diamond flakes, and then progressing (if one may presume to so call it) into the opaque carbonacular form called borts (like rough molten balls of glass), and when broken furnish fibrous splinters like asbestos, which are used for drilling holes in jewels, &c. Finally, they verge into the lamellar translucent and transparent state, having a cleavage like mica, of geometrical forms. Some of these crystals are formed with other small octahedron diamonds imbedded in the side facets. As to the uses of the diamond in various ages and by different nations, they are undoubtedly prehistoric, and might be classed in their uses among the stone age. It has been conceded by modern savants that they must have been used in the days of the Pharaohs for something besides amulets. At a meeting of the Anthropological Institute of London, not long since, by a reading before them, Mr. W. M. Flinders had collected evidence in a tomb at Gizeh that tools armed with jewels had been used in the form of solid or tubular drills, as well as saws. The lines in cutting stone with these tools leave an unmistakable trace of their workings, which no other tool does.

The unfinished obelisk at the Egyptian quarries, which has been lying there for over 4,000 years, has continuous spiral grooves, being of uniform depth, showing the cutting edge of the tool was not in any wise impaired. Diamonds had different names in various ages among nations and tribes. In the days of Solomon, 'samer' or 'shamer,' after the miraculous stone-working worm of that name; by the Egyptians, auerchilis or chalazias; Grecian, adamas or adamantine; and by the Jews, iahaome, &c. Thus lost arts are being restored to us by scientific research, and in recent years as well as the present. We now see the diamond advertised in multitudinous branches of arts. We had occasion, in our issue of May 5, 1876, to refer to diamonds and their uses, since which they have been growing rapidly in favour for trimming or truing chilled iron, paper calendar and porcelain rolls, emery wheels, sawing and trimming stone, boring rock for tunnelling and prospecting mines, &c.

The most fashionable neck ornament for a young girl is a row of pearls. Very few people are prepared to pay the number of pounds which a row of real pearls is worth; but there is an excellent imitation sold which almost defies detection by an expert. Every bead is a faithful copy of a real pearl, and the maker obtained a prize in the Paris Exhibition. There are several kinds. The best has the effigy of a gold coin in paper attached to the strings; the next, one in silver; and the third, a green one; but all are far above the average of ordinary ornamental pearls. Paste is coming much to the fore again, and requires to be good. Paste buttons are so well cut and mounted that it is difficult often to tell them from brilliants; so, also, the paste snaps, paste buckles for waistbands and shoes; but, to be worth anything, they should be veritable copies from the antique.

The History and Object of Jewellery.

By John Jones, F.R.G.S., &c.

(Continued from page 139.)

THE most noble and costly of all ornaments is the crown, adorning the most conspicuous part of the person and the most exalted person in the state. From the East we received the scale of social classification, and with it the distinctive badge of authority. Imperial crowns in Persia and neighbouring countries are circles of gold enriched with rays, as of light, representing the sun. The less despotic relation of our early Saxon kings to their subjects was sufficiently expressed at first by the circle of gold only; increased ornament resulted from increased wealth: leaves were added as in triumphal crowns of old, and the flower of the lily, or *fleur de lis* (a flower sacred to the Virgin), distinguished the King of France from his dukes. King Egbert added the rays to the crown; King Edward Ironside tipped them with pearls; William the Conqueror, as Duke of Normandy, introduced leaves and crosses (the tokens of religion) among the points; Edward III., for distinction between himself and nobles, substituted the royal bearing of France (of which country he claimed sovereignty), viz., *fleur de lis*, for the leaves; and the royal crown of England has since then been enriched with crosses and *fleur de lis*.

The ray-like coronet was handed down to viscounts, earls and barons. Henry VIII. had two arches intersecting, in the form of a cross, added to the crown, and a mound or orb, expressing universal rule, was placed on them surmounted by a cross. The mound in our crown was one stone, an aquamarine; in one of the crosses is a ruby, value £10,000, presented to the Black Prince by King John of Portugal. Since this time no alteration has been made in the form: successive sovereigns have had the stones remounted to fit their heads.

Rings are also favourite types of royal consecration. Their form is the emblem of eternity. In the ancient pictures of Prometheus, says Pliny, he is always represented with an iron ring. If fate willed that the throne and crown must be left behind, yet the coronation ring was entombed with its wearer. Richard II. directed that a ring set with precious stones, value twenty marks, should be buried with him, according to royal custom. On opening the tomb of Matilda, wife of William the Conqueror, a sapphire ring was found buried within; and, in that of Childeric, King of the Franks, was found his coronation ring: facts sufficiently explaining the term of the edict *more regio*. Reference has already been made to the jealousy with which the use of gold rings was guarded in ancient Rome. Even the bridegroom might only send an iron ring to the bride, as the token of espousals. The use of a ring in our marriage ceremony conveys the idea of eternity in the contract. Hannibal illustrated the slaughter of the Roman knights by causing their rings to be collected; they filled three measures, being 5,000 in number, and were sent to Carthage as his trophy. Some interesting passages in history turn on the use of the ring as the pledge of friendship.

Elizabeth's vow of constant favour to Essex was embodied in a ring; with what ill-consequences to the latter is well known. Shakespeare's description of the alarm among the nobles on Cranmer showing the king's ring, will enhance the honours of a ring, and confirm the practice of the gift of a ring as the best testimony of regard. In the East, rings are even now used in mercantile transactions: each merchant has his signet, and his seal is the equivalent to our signature. In our own day, a legal instrument under seal is a higher legal security than one signed or under hand only; the former is called a specialty, the latter a parole or simple contract. As a protection against the dangers of a counterfeit seal, engravers in the East are forbidden to copy a seal, and all that they execute are registered; if the seal be lost, notice is given to all correspondents that in future the writer's seal will be of a specified character.

An attachment to heraldic distinctions—a laudable instinct of our nature, corrective of much ill—creates a large demand for signet rings in this country. The early Saxon triangular shield, the Spanish square, but rounded at the bottom, the lozenge and antique oval, or the more ornately bordered shields of Henry VIII.'s time, afford variety to the jeweller in the manufacture of rings as shields for engraving, and meet the varied tastes of wearers. Rings are also worn as memorials of deceased friends. In 1487, Sir Edward Shaw, alderman and goldsmith, of London, directed that sixteen mourning rings should be made, with the well of mercy, the well of pity and the well of everlasting life portrayed thereon; doubtless referring to the wounds of Christ. Rings were also worn as amulets.

On an ancient ring, found about twenty years ago (and for this and many other facts throughout this paper, I am indebted to the Archæologia), is an engraving of our Saviour on the cross, with the emblems of His passion, the wounds in His sides and limbs, and with this motto around it, "*Vulnera quinque dei sunt medicina mei.*" Marcellus, a physician in the time of Marcus Aurelius, recommended a gold ring to be worn for a pain in the side; Trallian, another physician of the fourth century, advises their use; even Galen recommends a ring, with the figure of a man engraved on jasper, for some malady. Rings of gold cured St. Anthony's fire. In the Earl of Aberdeen's museum is a ring with a Runic inscription, referring to this belief. The Latin motto runs thus: "*Febriculus vel leprosus lætus in morbo.*" In a crusader's ring, found in the palace of Eltham, in Kent, is the following inscription:—

"*Qui me portera exploitera,*
Et a grand joye reviendra."
"Who wears me shall perform exploits.
And with great joy return."

The charm of rings against danger is still a portion of a sailor's faith; nor let the reader start with wonder at the credulity, for perhaps he will find a galvanic ring on his own finger.

Cameos and mosaics are materials for brooches. A paper read before the Society of Arts, and which appeared in their Transactions, gave a statement, interesting, both for novelty and commercially, of the manufacture of cameos in Paris from West Indian shells. This trade has been raised within the last 50 years, and thousands are now employed in the production of artistic beauty through the medium of brooches made of these ornaments.

The plan on which Roman mosaic pavements are constructed obtains on a smaller scale in the composition of mosaics, for which Rome is noted; beautiful miniature paintings, tinted with extreme delicacy, are formed by small blocks of coloured enamel, connected together with invisible joints. These, and cameos in gold borders of scroll or other patterns, form the most prevalent fashion for brooches.

Gold chains are also tokens of authority. From the investiture of Joseph in the days of Pharaoh, to the installation of the Lord Mayor on November 9 last, their honorary character has been acknowledged.

The splendour of effect which is now produced on the surface of gold, by polishing it on a metallic plate, renders chains both honourable as the insignia of rank and pleasing for their beauty.

The diamond is the chief of stones, the hardest and most luminous, even phosphoric in the dark. Among the ancients the perfect crystals were alone valued. They were not aware of that property which enables modern diamond workers to produce such brilliancy, viz., the use of its own powder as the cutting agent: many stones which, with our skill, are of enormous value, would have been rejected by them. Though said by Pliny to be so hard as to indent the hammer that strikes rather than break, in the direction of its axis of crystallisation it fractures readily. This quality is used in the first stage of manufacture. It was in the year 1476, that Louis de Berghem, of Bruges, first discovered the property of powdered diamonds and the mode of application. Roses and table diamonds were the only kinds that he produced. The most perfect shape for reflection and refraction of light is that which is called the brilliant: being two truncated pyramids united at their bases, the upper bearing to the lower in height above the girdle or line of junction the proportion of five to ten, leaving the plane of truncation, or the culet of the lower pyramid, one-fifth the superficies of the upper, or, as for distinction it is termed, the table. The sides of the upper pyramid are covered with triangular facets; those which have their base on the base of the pyramid are called skill-facets, those radiating from the table are called star-facets. These in a well-cut stone meet half-way down the sides. The lower pyramid is similarly treated; the skill-facets being to the culet-facets as three to two in length. This is the best form for bringing out the brilliancy of the diamond: if the sides are too perpendicular, the light is radiated from the eye of the spectator; if too horizontal, a flatness of lustre arises, for the light passes more easily through the crystal in the direction of its poles than transversely through its laminæ; it is, therefore, in a thin brilliant less reflected.

(*To be continued.*)

Review.

Calvert's Mechanics' Almanac and Workshop Companion for 1887.* This useful little work has now reached its fourteenth year of publication, and the present issue is in every way worthy of its predecessors. It contains a variety of general information calculated to be of use to all classes of mechanics. The workshop recipes and tables of reference are particularly valuable and interesting, while intermixed with the more solid information, such as hints to intending patentees, &c., is lighter reading, consisting of anecdotes and biographical sketches in the form of notes to the calendar, suitable to the time of year at which it appears.

Meetings of Societies, &c., for the Month.

Societies.	Jan.
Inventors' Institute, Lonsdale Chambers, Chancery Lane	10, 24
Photographic, 5*a*, Pall Mall East	11
Society of Arts, John Street, Adelphi	19, 26
Geological, Burlington House	12, 26
Numismatic, 22, Albemarle Street	20
Mathematical, 22, Albemarle Street	13
Royal Astronomical, Burlington House	14
Royal Meteorological, 30, Great George Street ...	19
Geologists' Association, University College	7
Royal Microscopical, King's College	12
Quekett Microscopical Club, University College ...	14, 28

Adam Schaefer's Compound for Improving the Quality of Steel.

By S. Lloyd Wiegand.

[*Abstract of a Communication, presented at the Stated Meeting of the* Franklin Institute, U.S.A., *held Wednesday, October* 20, 1886.]

THIS compound is the subject of letters patent of the United States, numbered 341,173, and dated May 4, 1886. It consists of resin, linseed oil, glycerine and powdered charcoal, heated and intimately mixed in the proportions stated in the specification.

It is used by heating the steel to a clear red heat and immersing and coating it in the compound, and the steel is afterwards re-heated and hardened in the usual manner by quickly cooling it.

Burned cast-steel is restored to its original condition, and the softer grades of steel acquire the properties of cast-steel, by being treated as above stated. Tools made from Bessemer steel, which is incapable of being hardened, are, after treatment with this compound and hardening, capable of cutting cast-steel.

Tools so treated possess a greater durability than before, and are capable of cutting castings which resist the best of ordinary cast-steel tools.

The grain of steel exhibited by fracture of tools so treated, as compared with the same material before treatment, shows a difference analogous to that between fine cast-steel and coarse or blistered steel.

The compound applied to grey castings and malleable iron castings imparts a degree of hardness to them superior to ordinary case-hardening.

It is not attended in use with the unpleasant and deleterious fumes incident to case-hardening compounds containing hydrocyanic acid, and is much less expensive.

Specimens of different materials in their normal state, and also as treated with this compound and hardened, were submitted, properly labelled, which conveyed a clearer conception of the effect than could be stated in language.

In order that the facility of application and its effect may be seen, a forge with fuel and bars of steel and other metal and a supply of the compound were submitted, by means of which the members who felt inclined personally tested it after the close of the meeting.

The compound has been introduced into practical use in many manufacturing establishments in this city with uniformly satisfactory results.

APPLICATIONS FOR LETTERS PATENT.

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, and 6, Lord Street, Liverpool.

15,249. F. J. Biggs, London, for "Light-emitting frames for the illumination of the plane surfaces of tables, looking glasses, pictures, clocks and similar plane surfaces." Dated November 23, 1886.

15,514. S. Leighton, Liverpool, for "Improvements in cases and other parts of watches." Dated November 27, 1886.

15,562. W. Hardy, Jun., London, for "Improvements in synchronising timepieces." Dated November 29, 1886.

15,639. J. T. Wright, London, for "An improved safety watch guard." Dated November 30, 1886.

16,004. J. Nicholas and H. H. Fanshawe, London, for "An improved process for procuring the precious metals from their ores." Dated December 7, 1886.

16,122. J. F. Goode and A. C. Goode, Birmingham, for "Improvements in the manufacture of swivels for watch and other chains, or forming parts of other articles of jewellery." Dated December 9, 1886.

16,126. F. Baron Von Wechmar, Birmingham, for "Improvements in watches, clocks and other timekeepers." Dated December 9, 1886.

16,158. H. Dalgety, London, for "A construction of candle holders to show illuminated time." Dated December 9, 1886.

16,233. J. Baker, Birmingham, for "Improvements in belcher and other bracelets and scarf rings." Dated December 11, 1886.

16,237. G. F. Spittle, Birmingham, for "Improvements in solitaires, cuff links and other like dress fasteners." Dated December 11, 1886.

16,709. A. M. Clarke, a communication from S. P. Sandmark, United States, for "An improved clock movement frame." Dated December 20, 1886.

Recent American Patents.

A CUFF button has been patented by Mr. William Riker, of Newark, N.J. This invention covers a special construction of the plate and the post in that class of buttons that are adapted to be screwed or turned into and out of the button holes of the cuffs.

A revolving exhibitor has been patented by Mr. William F. Miller, of Butler, Pa. It has a fixed circular base, which is hollow, and has a motor for reversing an upwardly projecting pin, moving a vertical shaft and rods, for exhibiting dry goods, notions, jewellery and other articles to great advantage.

An electric alarm for timepieces has been patented by Mr. Frank Glasgow, of Osceola Mills, Pa. The spring arbor of an alarm clock carries a crank, combined with which is an electrical contact lever, with a pivoted releasing lever extending into the path of the crank, whereby an electric circuit may be completed and an alarm sounded electrically.

A compensation pendulum has been patented by Mr. John Gerhardt, of Montreal, Quebec, Canada. The compensating rod and pendulum are both made of the same metal, and are combined with pivoted connecting devices separated at one end by the compensating rod, and from which the pendulum is suspended, so that the contraction of the rod will lower the pendulum and its expansion raise it, exactly as the pendulum contracts and expands under the same temperature.

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* Just published. By William Calvert, Member of the Civil and Mechanical Engineers Society, London. *Price 4d.* London: John Heywood, 11, Paternoster Buildings; and of all Booksellers and Railway Bookstalls in the United Kingdom.

Gazette.

Partnerships Dissolved.

Tainsh Brothers, Cardiff, jewellers. W. & S. Freeman, Birmingham, thimble manufacturers. Dixon & Cassey, Birmingham, electric clock manufacturers. E. & E. Saqui, Edgware Road, jewellers. Robinson & McKewan, Birmingham, jewellers; so far as regards W. Robinson. L. S. Gregory & T. W. Gregory, Eastbourne, engravers.

THE BANKRUPTCY ACT, 1883.

Receiving Orders.

To surrender in the Country.—Robert Jones, Cheetham, art metal worker. Charles William Hurt (trading as Hurt & Sons), Birmingham, watchmaker. Horatio Albert Dightam, Leeds, jeweller. Charles Ankers, Southport, watchmaker. Ferdinand Charles Munford, Crewkerne, watchmaker. Thomas Wheeler, Preston, watch manufacturer. William Rawlin, Newark-upon Trent, watchmaker.

Public Examinations.

In London.—F. Jacobowicz, Milner Square, Islington, diamond merchant; January 21, at 12.

In the Country.—H. A. Dightam, Armley, Yorkshire, jeweller; January 4, at 11. C. Ankers, Southport, watchmaker; January 12, at 11.30. F. C. Munford, Crewkerne, watchmaker; January 13, at 12. T. Wheeler, Preston, watch manufacturer; January 7, at 11.

Adjudications.

In London.—F. Jacobowicz, Milner Square, Islington, diamond merchant.

In the Country.—R. Jones, Cheetham, art metal worker. C. W. Hurt (trading as Hurt & Sons), Birmingham, watchmaker. C. Ankers, Southport (formerly of Nantwich), watchmaker. H. A. Dightam, Leeds, jeweller. T. Wheeler, Preston, watch manufacturer. F. C. Munford, Crewkerne, watchmaker.

Amended Notice.—F. Dandridge (trading as the Clerkenwell Watch Co.), late Newgate Street, E.C.

Notices of Dividends.

In London.—T. Till (trading as Till & Lyns), Bartlett's Buildings, Holborn Circus, and elsewhere, manufacturing jeweller; 1s. 9½d., first and final; December 9, 120, Colmore Row, Birmingham. T. W. Cooper & A. Cooper (trading as Thomas W. Cooper & Son), Chippendale Street, Lower Clapton, watch manufacturers; 3s. 4d., first; any day (except Saturday), Chief Official Receiver's, 33, Carey Street.

In the Country.—H. Hodkinson, Coventry, art metal worker; 1s. 0⅝d., second and final; December 17, Official Receiver's, Coventry. A. J. Galli & T. Hauxworth, Leeds, jewellers; 7s. 6d., first; December 18, 1, Bond Street, Leeds. W. A. Chandler, Birmingham and Harborne, Staffordshire, wholesale jeweller; 9d., second and final; January 3, 18, Temple Row, Birmingham. C. H. Whiston, Birmingham, jewellers' factor; 2s. 1¾d., first and final; December 23, 120, Colmore Row, Birmingham. T. Goodger, Carlisle, clockmaker; 2s. 3d., first and final; on and after December 29, Official Receiver's, Carlisle. J. Oglethorp, Penrith, clockmaker; 5s. 3⅛d., first and final; on and after December 29, Official Receiver's, Carlisle.

Amended Notice.—R. Attenborough, Great Queen Street, Lincoln's Inn Fields, and elsewhere, jeweller, &c. (lately trading as Stenson & Co., Attenborough & Co., the Hall O'Lee Colliery Co., the Wedgwood Coal Co., the Lower Resolven Coal Co., the Strata Florida Lead Mine Co., Roe & Co.); 9d., third; September 1, R. Mackay, Lothbury, City.

Scotch Sequestration.

J. S. Matheson (trading as Matheson & Co.), Leith, watchmaker.

Correspondence.

All Letters for Publication to be addressed to the Editor *of* The Watchmaker, Jeweller and Silversmith, *Imperial Buildings, Ludgate Circus, E.C.*

All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.

[GOLD PLATING PROCESS.]

To the Editor of *The Watchmaker, Jeweller and Silversmith.*

Dear Sir,—Will some of your kind readers be good enough to show me a method of darkening a gold solution? I have used the chloride of gold you buy, and also made it myself—2 tubes to the half-pint and 1½ dwt. of wedding ring—but the articles gilt are too pale. Kindly state the quantity of cyanide to the pint, and the best battery power for small gilding? By doing so you will greatly oblige

"A New Subscriber."

P.S.—A solution to be used cold if possible.

[This is a subject or rather art most difficult of acquirement, since it is only by close observation that the causes which effect the many variations in result can be discovered. Briefly stated there are three principal elements which affect the colour of the deposit:—1st, battery power; 2nd, temperature of solution; and 3rd, the distance of the object from the anode. *Battery power.*—The stronger the battery power the darker the deposit; for small articles a single Smee cell should be sufficient. The limit to the battery power is the point at which bubbles of gas appear on the object—the electromotive force of the battery is then too strong. *Temperature of solution.*—The temperature of the solution should be from 130° to 180° Fahr.; the warmer the solution between these limits the darker the deposit. *Distance from anode.*—The closer to the anode the darker the deposit. During the time of deposition the article should be kept in motion, and it may as well be noted here that different rapidities of motion vary the colour of the deposit. The best solution is made by dissolving the cyanide of gold in cyanide of potassium—about 4 dwts. of gold cyanide to the pint of potassium cyanide solution. The colour of the deposit may be darkened as follows: mix together one part of alum, one part of zinc sulphate, one part of common salt, and two parts of saltpetre, with water so as to form a paste. Coat the article with this paste and place it upon an iron plate to be heated over a Bunsen burner or over a clear fire; after heating, throw the article into cold water.—Ed.]

[DIE STEEL.]

To the Editor of *The Watchmaker, Jeweller and Silversmith.*

Sir,—We have difficulty in getting steel suitable to make dies for the manufacture of gold, silver and bronze medals. It appears there is a special steel made by manufacturers for this purpose, a steel which is specially suitable to make the fine temper required for this work, and that will not sink or fly when subjected to the heavy pressure in the making of the medals. Could you give us the name of any person who could supply us with this steel, or forward this communication to such person for reply? By doing so you will oblige

Yours truly,

P. W. Ellis & Co.

31, Wellington Street East, and 40, Front Street East,
Toronto, *December* 9, 1886.

[The die steel used by the Royal Mint is obtained from Messrs. Turton, Bright & Co., Soho Works, Sheffield. It is specially made for the Mint, but doubtless they could supply generally. The metal is delivered in long bars.—Ed.]

Buyers' Guide.

The Sheffield Smelting Company, Sheffield, *Sell* Gold and Silver (pure and alloyed). *Buy* all materials containing Gold and Silver.

F. W. Powell, Jeweller and Silversmith (Manufacturing), 23, Great Sutton Street, Clerkenwell, E.C. Wholesale only for Gold and Silver Jewellery; Silver Cigar, Cigarette and Card Cases, Match Boxes, Salt Cellars; Silver and Glass Smelling Bottles; Sovereign Purses.

Jones, E. A., Wholesale Manufacturer of Whitby Jet Ornaments. A Large Assortment of the Newest Patterns always in Stock. Export Orders promptly executed. Persons not having an account open will avoid delay by forwarding a reference with their order. Customers' Matchings and Repairs with despatch. 93, Hatton Garden, London, E.C.

For cheap, quick, reliable Watch and Jewellery Repairs, by the most Experienced Workmen, send to Alexander Edwards, Watch Material and Tool Dealer, 88 & 89, Craven Street, and 2, Holyhead Road, Coventry. Lists: all Horological Literature.

M. W. Skelton, Inventor and Manufacturer of Fusee Keyless and other Watches, Liverpool. Manufactory: 6, Park Place. New Wheels and Pinions. Conversions and Jobbing done in general for the trade. Country orders promptly attended to.

The Watchmaker, Jeweller and Silversmith.

EDITED BY D. GLASGOW, JUN.

Entered at Stationers' Hall.] *[Registered for Transmission Abroad.*

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The Watchmaker, Jeweller and Silversmith.

A Monthly Journal devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

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Cheques and Postal Orders to be crossed and made payable to J. TRUSLOVE.

AGENT FOR THE AUSTRALIAN COLONIES:
EVAN JONES,
Hunter Street and Royal Arcade, Sydney, N.S.W.

Editorial.

THE discovery of any short road to wealth has from time immemorial always had the effect of changing the current of man's ordinary thoughts, diverting them from the usual channels, and, by bringing out his innately baser nature, leading him to act as, what appears to the unaffected observer, an unreasoning animal. It seems indeed that to remove the thin cloak of civilisation which serves to regulate his natural instincts, it is only necessary to excite his cupidity.

Such has been the unvarying history of the discoveries which have been made at various intervals and in different localities of gold and silver and precious stones. The repeated "rushes" made for the mining districts which have been favourably reported on by the prospectors have been examples of this in the near past, and one does not require to look far to see the same demoralising influences at work at the present time. The feeling which, according to the latest reports, leads the mining community at the Cape to regard with very mixed sensations the recent discoveries of diamonds in South Australia, is not a very great remove from infatuated acquisitiveness to whose origin crimes of all descriptions and swindles of every degree of ingenuity are in most instances distinctly traceable. Happily the influence of greed affects different classes in different ways, and a wide gulf would have to be passed before the person who is engaged in "watching the markets" would be guilty of any action derogatory to his reputation as a business man, to whom "honesty is the best policy." But speculation has a lowering tendency, and that the gulf dividing it from positive dishonesty is too frequently passed is evidenced by the numerous prosecutions and convictions recorded in our modern criminal annals.

The Americans, who are ahead of us in so many other things, fortunately take the lead also in their methods of levelling the distinction between *meum et tuum*. The daring robbery from a jeweller's front window, an account of which we give in another column, would, we flatter ourselves, not have a very successful termination to the perpetrators if carried out in Bond Street: and our gentlemen of the proverbial "three outs" have not perfected themselves in what is known among Transatlantic jewellers as the "red pepper dodge." Still there is sufficient ground for anxiety in the face of recent developments in the shape of "doublet" and "stained diamond" swindles, and it behoves a who are within the reach of that class of the community who trade on the unsuspicious to exercise great caution and discrimination.

Our thieves are perhaps not great at originating, preferring, as they do generally, to rely on the old "dodges;" still they are admirable imitators, and it may perhaps be not long before we hear of some of those who have long enjoyed immunity from their operations being victimised.

The death of Sir Joseph Whitworth, which we announce in another column, will be heard of with regret by all classes, but more particularly by those connected with scientific or educational interests, to whom it leaves a blank not easily to be refilled. To the former he was, of course, best known from the systems of standard planes, gauges and screws originated by him and associated with his name; while to the latter and the general public his magnificent endowments, known as the "Whitworth Scholarships," are the medium through which the name of their founder is most familiar. These annual scholarships together amount to the sum of £3,000 a year, and represent a sunk capital of £100,000, which is the largest individual grant to the cause of technical education ever made.

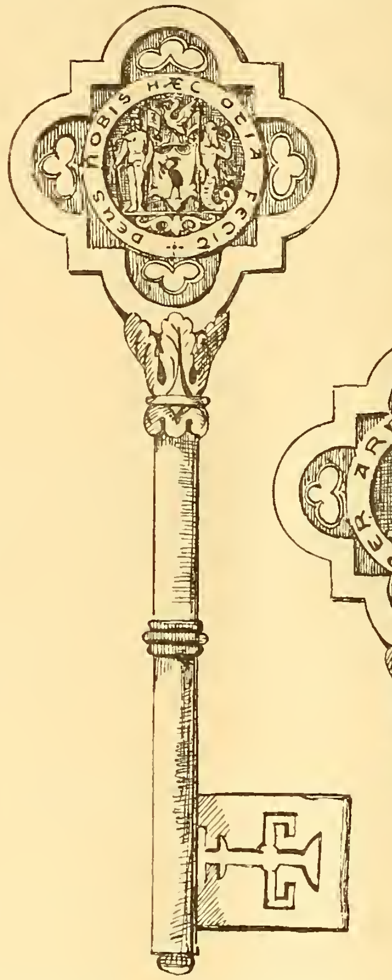
Sir Joseph Whitworth was born at Stockport, in 1803. At the age of 22, after some experience at the work-bench in the Manchester shops of Marsden, Crichton and others, he came to London, where he worked in the shops of Maudsley, Clements, the constructor, with Babbage, of the calculating machine, and Holtzapfel, in the last of which he developed the innate love for exactitude for which he was so peculiarly distinguished. The universality of his mechanical applications in this last direction left almost nothing untouched, and watchmakers will always remember with gratitude the systems of standard gauges he devised for their benefit and attempted, although ineffectually, to get them to adopt.

The False Marking of Imported Goods.—The Sheffield Town Council recently memorialised Lord Salisbury to introduce a Bill to amend the Merchandise Marks Act, 1862, to effect the suppression of false marking. The Prime Minister replied on the 12th ult. that the subject was still receiving the careful attention of the Government. The Home Secretary having been requested to receive a deputation to urge the issue of a Royal Commission to inquire as to the false marking of goods, Mr. Matthews has replied that he has not charge of the department to which is entrusted the duty of promoting legislation on these subjects. He, however, requests more exact information concerning the nature of the powers which the Town Council wish to see given to the proposed Commission. The President of the Board of Trade has consented to receive a deputation from Sheffield on the subject, and assures the Council that it is receiving attention.

The series of articles on "Watch Jobbing," by X. O. N., will be continued in our next issue.

General Notes.

The accompanying illustration represents the handsome silver key presented to Mrs. W. T. Mann on the occasion of the opening of the Girls' Industrial School, Nile Street, Liverpool, on December 14. The wards and shaft of the key are burnished, the latter having a gilt cincture in the middle. The shaft forms a column, the capital of which supports the handle in the shape of an ornamental cross. The border of the cross on either side is of frosted silver, enclosing a smaller one of dead silver, inside of which are medallions containing respectively: on the obverse, the crest, a goat's head, surrounded by a border, with the motto "*Per ardua stabilis;*" on the reverse, the arms, gilt and engraved, with the motto "*Deus nobis hæc otia fecit.*" The key, which is a very elegant and highly finished piece of workmanship, is from the manufactory of the well-known firm, Messrs. T. J. Paris & Co., of Lord Street, upon whom its design and execution reflect great credit.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Barcelona Exhibition.—An International Exhibition will be opened at Barcelona on September 15 next. It is to last six months at least, but, in case of prorogation, may be extended to eight months. All products and manufactures connected with agriculture, industry and commerce will be admitted, and many International Congresses will be organised: among others, an International Commercial Congress will be held, which is to be presided over by M. de Lesseps. The Spanish Government will take the necessary measures to protect, in Spain, inventions liable to be patented, as well as models or designs and trade marks. Applications for space should be addressed as soon as possible to Señor el Secretario General de la Junta Directiva, Offices of the International Exhibition, Barcelona.

The International Exhibition at Barcelona.—Messrs. Bates, Hendy & Co., of 37, Walbrook, who have been appointed as delegates for the Midland counties of England at the International Exhibition, to be opened in Barcelona in September 1887, have issued a comprehensive pamphlet in regard to the Exhibition. The text of the general regulations governing exhibits and the details as to applications for space, &c., will be found useful to manufacturers and merchants who desire to show their wares to the best advantage.

Adelaide Jubilee Exhibition.—Since the issue of the Royal Commission and the publication of the measures taken for representing British exhibitors' interests at Adelaide, a very large increase to the numbers of intending exhibitors in the Industrial Department has taken place, and many applications have also been received from the Continent, chiefly from Germany and Belgium, as also from Canada and the United States of America. Though half of the entire space of the building has been put at the disposal of the London Committee, the Executive have great difficulty in finding room for all applicants. Following the precedent of the Philadelphia Exhibition of 1876, the Royal Commission have obtained special passenger and freight rates for *bonâ fide* exhibitors and their goods from some of the principal shipping companies and firms connected with the South Australian transport trade, including the Peninsular and Oriental, the Orient, the Anglo-Australasian, and the Messageries Maritimes Companies, and such firms as Messrs. Anderson, Anderson & Co., Sutton & Co., Horne & Crampton, R. E. Drummond & Co., F. Tallock & Co.; and a circular embodying this information is being issued from the Royal Commission Offices to the 533 exhibitors at present on the lists.

The Australian Centennial Exhibition.—The Executive Commission for the Centennial Exhibition, to be held at Melbourne in 1888, has been appointed. It consists of fifteen members, Mr. Higinbotham being president; Sir James McBain, Hon. Peter Lalor, Sir William J. Clarke, Bart., and Hon. F. Sargood, vice-presidents; and Mr. Lavater, secretary. The General Commission will be appointed later on.

The Liverpool Exhibition.—A meeting of local theatre managers and representative tradesmen was held at Liverpool on the 4th ult. to protest against the continuation of the Liverpool Exhibition for another year. A general opinion was expressed against the proposal, which, it was stated, would be damaging to places of amusement and to the tradesmen. A memorial embracing the sentiments of those present was unanimously adopted, and a deputation appointed to present it to the City Council.

On January 7 a conference was held between the owners of the Liverpool Exhibition buildings and the Council, representing the guarantors, who have decided upon continuing the Exhibition this year. An arrangement was come to on very favourable terms, and it has, therefore, been finally decided to hold an International Jubilee Exhibition in Liverpool this year, on a scale similar to that of last year, subject to the satisfaction of the General Council of the Exhibition.

International Exhibition at Toulouse.—An International Exhibition of industrial, agricultural and fine art products is to be opened at Toulouse on May 15 next, under the direction of the municipality, with the assistance of local notabilities and chambers of commerce. The buildings, which are being constructed, will cover an area of 25,000 metres; they are situated in the middle of the splendid public gardens of the town, which are more than 800 acres in extent. It was at first designed to admit only the representatives of France, Spain, Portugal and Italy to the conferences which are to be held, but, owing to representations from other countries, the restriction was removed, and all will now be represented. It is stated that the Exhibition will be worthy of the geographical, literary and scientific capital of the middle of France. Class 23 includes jewellery, goldsmiths' work, religious and art metal work, and electro-plated goods. Intending exhibitors should apply to the Mayor of Toulouse for further information. The Official Journal of the Exhibition will be sent free on application.

Among the numerous mementoes devised to commemorate the Jubilee year none have evidenced a happier idea, nor a better taste in its fulfilment, than the series of brooches designed by Messrs. Johnson, Walker & Tolhurst, of 80, Aldersgate Street, E.C. The series comprise a set of twelve brooches of different designs, all of which are so chaste and artistic in character as to render a selection of any for special notice a matter of extreme difficulty. The brooches are reproduced on a coloured, lithographed sheet (which may be had on application to the firm), and are numbered 1 to 12. No. 6 is a pearl and diamond sceptre and crown brooch, the crown of which is of diamonds with an enamel background, the two sceptres being crossed underneath; at the intersection of the sceptres is a brilliant, and the ball of each is formed of a single pearl. An enamelled ribbon depends from the sceptres, bearing the motto, "God save the Queen," from the lower part of which is a pearl pendant. No. 9, the other example we select for illustration, is a diamond crown and sceptre brooch with ribbon entwined. The woodcuts, however, fail to convey a just impression of these brooches, which must be seen to be appreciated. The original brooches were submitted to the Queen, who greatly admired them, and officially thanked the firm through Sir Henry Ponsonby.

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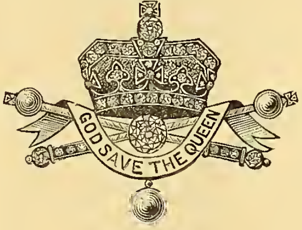

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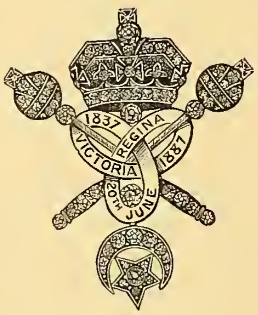


No 9

The Sale of the French Crown Jewels.—The law was published on January 11 in the *Official Journal* for the sale of the Crown Jewels. They are to be sold by public auction, but it is not yet decided whether the auctioneer's percentage is to go to one salesman or to the whole corporation of auctioneers: the latter is thought the best way to protect the State from underhand collusion. The jewels to be reserved are in three categories, marked A, B and C. In the first are comprised the famous sword, the reliquary brooch, the Regent diamond, the dragon in rubies, pearls and enamel, the Elephant of Denmark. Those of Section B are to be placed in the Museum of l'Ecole des Mines. They are the diamond jewels known as briolettes, three rubies, twelve amethysts, thirteen large pearls, a lot of smaller ones, two lots of turquoises, one lot of pink topazes, one lot of black pearls, a lot of emeralds, an opal, a large uncut diamond, and several lots of uncut rubies, sapphires, emeralds and diamonds. Lot C comprises the Imperial Crown, the sword of the Dauphin, and the sword of Louis XVIII. The gold in them is to be sent to the mint, and the stones they contain are to be sold.

The church at Ranmoor, Sheffield, which was recently destroyed by fire, was entirely built by Mr. John Newton Mappin, who died in 1883. The deceased also gave the whole of his pictures to Sheffield, and left £15,000 with trustees to build an art gallery, which, it is hoped, will be opened early this year.

The following interesting objects of art have been devised by the late Pope, Pio Nono, whose will was recently published :—To Monsignore Ricci, the statue of St. Pietro on the Column, which is the model of that to be erected in St. Pietro, Montorio ; to Monsignore Pacca, the model of the Column in the Piazza di Spagna. The silver shrine which represents a little altar with the wood of the Holy Cross, with other relics, to the Vatican Basilica. A shrine which represents a little temple, supported by three cherubs, is destined to the collegiate church of St. Maria in Via Lata. A small temple, with little rock crystal columns, containing the relics of St. Peter and St. Paul, to the cathedral of Senigallia. To the two cathedrals of Spoleto and Imola, two shrines : to the first the wood of the Holy Cross on a silver stem with silver base, all ornamented with diamonds ; to the second a small urn containing the relics of St. Damaso. To the cathedral of Gaeta, an ivory crucifix on a black cross and pediment. To Cardinal Antonelli, a case of brilliants of an oval form, ornamented with enamel. The last bequest was supplemented by a codicil as follows :—" To the two cardinals substituted for the defunct Antonelli, I leave a case with brilliants to Cardinal Mertel, and a crucifix to Cardinal Simeoni. The crucifix is on a cross of metal. The crucifix and the two statuettes of Maria Santissima and San Giovanni are in ivory. They are in the hall of the private library.—Pio, P.P. IX."

The well-known firm, Messrs. Charles Westwood & Sons, of 14, Hall Street, Birmingham, have just issued a new and revised price list, comprising a complete catalogue of all the requisites of jewellers, refiners, electro-platers, &c.; and the prices quoted are quite up to date, giving the narrowest margin of profit to the manufacturers. The liquid tests for the instantaneous detection of base coin and the so-called " Mystery Gold," which are specialties of this house and are sold by them at prices within the reach of all, should be in the possession of every dealer in the precious metals. In addition to the foregoing, the latest quotations are given for the purchase of old gold and silver.

The adoption by some of the large American railway companies of the 24-hour system of showing time, has led to a considerable demand on the part of the public in the States for watches having 24-hour dials, and this demand has extended to Canada. Owing to the recent action of the Union Pacific Railway Co., some of the leading American watch companies are now largely constructing such watches and putting them on the market.

Sir Joseph Whitworth, Bart, the head of the great engineering and arms manufactory at Openshaw, Manchester, died at Monte Carlo on the 22nd ult. For some years Sir Joseph had been in failing health, and had to winter in the South of France. He was in his 84th year.

It is officially announced from Mandalay that the ruby mines in the Mogouk Valley cover an area of twelve miles by eight, and that they are capable of yielding profitable returns, provided that the Government assume their entire control, excluding promiscuous purchasers, and granting concessions to experienced persons belonging to substantial firms.

Perhaps one of the most important (as it is the most recent) aids to the trading community, and more especially to those who have an infinity of small business transactions, has been introduced by Messrs. Norman & Co., Yeovil, Somerset, in the shape of a classified account book. This useful book is, as stated in the prospectus, presented to the trading community with a view of " reducing the labour," " saving the time," and " simplifying the principles of correct book-keeping." The system is arrived at by the book being ruled, printed and arranged in such a manner as to record the details of every day's ordinary business transactions in a simple and concise form, which dispenses with the labour and skill required in opening and keeping abstract accounts. It enables the trader to watch the progress of his business and to regulate his dealings to the requirements of the moment, and, as no special knowledge of book-keeping is required to use it, it will doubtlessly become a very general favourite, and have, as it deserves, a large sale.

The Hall-marking Question.—Deputation to the President of the Board of Trade.—In the report of the above which appeared in our last issue, in enumerating the various centres from which delegates were sent, the name of Prescot was accidentally omitted. Our attention having been called to this we are pleased to correct it, and trust our Prescot friends will excuse the inadvertence.

The Diamond Market.—The *Amsterdam* market is reported dull, the usual grumblings being heard with regard to the price of rough stones, notwithstanding which the manufacturers are fully occupied and many are enlarging their factories. This time of the year is always unfavourable for the sale of cut goods, added to which the rough and foggy weather has greatly interfered with business. The dealers complain of the indiscretion of the London holders, who, during the month of November last, had to return over 9,000 carats of rough stones to Kimberley as unsold. At *Paris* the market is very quiet, no business being done except at extremely low prices ; but business is expected to revive shortly, owing to the smallness of the stocks now on hand. The " Spartan," " Drummond Castle," " Pembroke Castle " and " Tartar " arrived at Plymouth since our last report, and, as the latter vessels brought lower quotations from the fields, considerable business was done. Numerous foreign buyers were present, and there was a good demand for cleavage and spotted of various sizes. At *Kimberley* the prices were unchanged at the beginning of the month, but have since declined in sympathy with the depression of the London market.

Silver.—The market has been very quiet throughout the month, and, although the price for bars rose to 47d. in the middle of the month, at which it has since remained steady, little business has been done. The allotment of the India Council bills on the 20th ult. did not affect the market as some speculators anticipated, and the prices remain at 47d. per oz. for bars, and Mexican dollars at 46d. per oz.

Technical Education.

The annual distribution of prizes to the students of the Onslow Science and Art College took place on the evening of January 7, at the premises of the college in King's Road, Chelsea. The prizes were distributed by Mr. Owen Roberts, M.A., and subsequently the students were addressed by Mr. Justice Denman, who in his remarks dwelt upon the great importance and value of technical education. It may be mentioned that in this school, which is rapidly growing in popularity among the inhabitants of Chelsea, classes are formed for the study of outline, ornament and the human figure ; light and shade drawing of the same subjects in chalk, sepia, oil and tempera ; drawing and painting from the living model ; anatomy, designing ; painting on porcelain, silk and china ; and modelling. The council in addition have resolved to make an earnest appeal for funds to complete the original scheme of erecting technical schools in connection with the present building. Among the prizetakers were Miss Spencer (National Bronze Medal and Queen's Prizes for painting from the flat), Miss Adams (first local prize for drawing and painting), Miss Baldwin (second ditto), Miss Collins (Queen's Prize and prize for drawing and painting), Mr. Adcock (medal from City Guilds Institute, iron and steel manufacture, and prize for chemistry), and Mr. Nichols (Queen's Prizes for mechanics and chemistry).

American Items.

THE *Jewellers' Weekly* says the most noticeable feature of the American trade with foreign countries during the month of September, as shown in the recently published report at Washington, is the increased importation of diamonds and precious stones by 75 per cent. over the figures for the corresponding month of last year, while rough diamonds show an increase of 80 per cent. An increase of about 30 per cent. in the importation of watches and materials is counterbalanced by as large a decrease in the importation of jewellery. With the exception of a decrease of about 30 per cent. in clocks, the exports differed but slightly from those of last September.

AND in another issue the same journal says that the holiday trade throughout the country was better this season than it has been for several years. The farmers have realised during the fall from satisfactory crops; the iron and kindred industries, on which so much depends, were in prosperous condition; and all things combined to create in the minds of the great middle class that spirit of indulgence which often looks for its gratification to the jeweller and silversmith. The consequent demand for goods has kept not only the retailers, but also most of the jobbers and manufacturers busy to their fullest capacity, and has brought them at the eleventh hour an amount of business which will no doubt handsomely round off the year's transactions.

A CONVENIENT AND CERTAIN MODE FOR TEMPERING STEEL.—Mr. James A. Peck, of Brewsters, N.Y., mechanical engineer of the New York Condensed Milk Co., writing to the *Scientific American*, December 11, 1886, gives the following method discovered by him, which he uses with great success for tempering all kinds of tools, knives, razors, steel dies and other implements:—"Take a suitable quantity of muriatic acid and dissolve all the zinc the acid will take. Prepare a tempering bath composed of one part of the above zinc acid and one part water. Heat the steel according to its hardness: if high or hard steel, heat until just red and then temper in the acid bath; if low steel, heat it as hot as you would to temper in water, then temper in the acid bath. After immersing in the acid bath, cool off in water. For lathe and planer tools draw no temper; but for other tools draw temper. Unlike water tempering, the colours that appear under this method give no clue to the hardness. By this process, steel is readily hardened to any desired degree, and may be made to cut glass like a diamond. If desired, an acid bath composed of two parts of muriatic acid and one part water may be used. Mr. Peck, however, prefers the zinc acid, as being more dense. A prominent advantage of this method of tempering is the certainty and excellence of its results. It never fails to yield the temper required. It can be relied upon for every description of steel or tool."

THE Board of Regents for the State Museum of Natural History, of Albany, N.Y., recently purchased the celebrated collection of minerals and gems made by Mr. George F. Kunz, of Tiffany & Co., N.Y., and it is now announced as being open to public inspection. Mr. Kunz's association with the above well-known firm has given him facilities for the accumulation of an almost unique mineralogical cabinet, and his position of annual reporter for the United States Geological Survey is, in itself, sufficient guarantee of its completeness. The entries in the catalogue number about 200, many of which include several specimens. In all there are over 500 gem stones, representing the products of the United States, Mexico, Brazil, South Africa, Ceylon, Burmah, Siberia, and many other countries. Among the many specimens, including the amethyst, emerald, sapphire, ruby, garnet, topaz, opal, cat's-eye, moonstone, turquoise, aquamarine, hiddenite, rutile, zircon and spinel, is to be seen the largest and finest blue tourmaline in the United States, found at Paris, Me., and measuring seven inches in length. The means of studying the natural occurrence of many of the gems are described by Mr. Beecher, who has charge of the palæontological department of the Museum, as being excellent, there being many specimens of the diamond-producing gravel of Brazil, rolled and worn rubies, sapphires and spinels as picked up in the gravel deposits of Ceylon and forming what is termed "gem gravel," and specimens of other species in the original matrix. The collection may therefore be considered *educational* in the highest degree, and will doubtless prove instructive to others besides the catechumen in mineralogy.

THE American Union Pacific Railway Co. announce that they are about to adopt the 24-hour plan of indicating time throughout their system, and that the clocks are now being prepared for this purpose.

A CORRESPONDENT of an American contemporary writes from Montreal, under date December 11:—"One of the Montreal creditors of the Toronto swindlers, Hurrich & Bush, has returned from an interview with them at Elmira, N.Y., to which place the absconders fled at the time of their failure. All they would offer in settlement is 25 cents on the dollar, which was indignantly refused. Mr. W. A. Addinsella, accountant, of Birmingham, England, representing the interests of the Birmingham creditors, has been here consulting the Montreal houses. At first he was decidedly in favour of endeavouring to extradite the absconders, but when he discovered how faulty the treaty was he abandoned the plan. It appears that in July last Hurrich purchased on credit over 60,000 dollars worth of goods from Birmingham manufacturers, for which they have not received a cent. Although the goods were regularly imported through the custom-house, they were never taken to the store, and the creditors are at a loss to know as to what was done with them. Many jewellery auction sales are advertised for the holiday season. The goods are imported from Birmingham and Switzerland."

THE WEAR OF GOLD AND SILVER COINS.—The Director of the United States Mint, Professor Kimball, has made a report on the losses on gold and silver coins by wear and abrasion, which are much more serious than most people probably imagine. Though no systematic investigations on an adequate scale have been made in America to determine the loss by actual wear of United States gold coin, yet, we are told, the results of such experiments as have been made show that the abrasion of gold coin under past conditions of circulation is at the rate of from 1½ to 2 per cent. per 100 years, or from 150 to 200 dollars per annum per 1,000,000 dollars. The experiment has recently been tried of aiding the American public in the discrimination between light gold coins and those of standard weight by stamping light gold coins with the letter L, so as to admit of ready detection. If such experiments continue at the sub-treasuries and mints of the United States, Professor Kimball believes that light coins will soon cease to perform the functions of legal-tender coin, and coin will be presented for redemption before progressive wear entails material loss. The loss on small silver coins in active circulation is estimated at from 0·1 to 0·2 per cent. per year.

A BIG robbery took place in Minneapolis on December 22. About 9 p.m. of that day, three men drove up in front of the large jewellery store of J. R. Elliott, corner of Nicollet Avenue and Third Street. Two of the men jumped from the sleigh, while the third held the horses. One of the men carried a heavy stick of wood, with which he smashed the large plate-glass show windows, in which were trays of diamonds, watches, &c., hurriedly seized all the valuable jewellery and threw it into the sleigh, while his accomplices kept the crowd of people that swarmed the streets at bay with cocked revolvers in their hands. Before anything could be done to apprehend them, both men had jumped into the sleigh and drove rapidly up the street, the driver wildly lashing the horses, and the robbers standing with revolvers pointed at the crowd. They secured between 6,000 and 7,000 dollars worth of diamonds and watches. For boldness and daring this exceeds the James Brothers' exploits. The streets were unusually crowded, and scores of people were looking at the display in Elliott's window at the time of the robbery. Several policemen were within half a block of the scene, but could not get there in time to apprehend the bold thieves.

A new book by Mr. S. M. Burnham has just been published in Boston, on "Precious Stones in Nature, Art and Literature," in reference to which the *Scientific American* says :—"The author has put together in this volume 400 pages of very readable matter touching precious stones and their imitations, as a sort of supplement to his former work on 'Limestones and Marbles,' published in 1883. The chapters relative to collections of precious stones, crown jewels, and prices, trade, pawns, &c., engraving on stones, and their secular and sacred uses, are full of interesting anecdote and detail drawn from a wide field of investigation. Nearly 100 pages are devoted to the diamond alone, and the relative hardness, specific gravity and principal constituents of precious stones. The book has a full index."

New Patent Chronograph and Repeater Watch.

MESSRS. DAVID L. A. NICOLE & CO., of 210, Goswell Road, E.C., have just introduced to this market a new minute chronograph repeater watch for which numerous advantages are claimed, in the way of simplicity and cheapness of production, over the types ordinarily constructed.

The invention aims at producing a cheap watch working with perfect precision, and presenting over chronograph and repeating watches now in use the following advantages : The striking of the quarters immediately after the hours ; the suppression of the fine teeth of chronograph wheels, with a view of obtaining a very exact working of the starting and stopping mechanism ; the addition of a minute indicator working with great precision and at the exact moment that the hand of the chronograph arrives at twelve o'clock.

There is an important reduction of the number of pieces forming the mechanism, and in being able to choose the form of such pieces with a view to manufacture the same much cheaper and interchangeable by machinery.

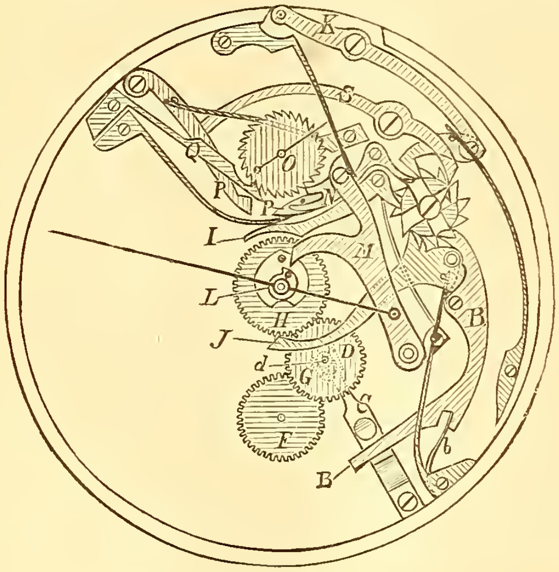


Fig. 1.

The movement of the watch, with which is combined the chronograph and repeating mechanism, may be of any system, but such is not represented in the accompanying drawings, for the sake of clearness. For the same purpose the parts of the mechanism relating to the repeating work, and the parts relating to the chronograph, are both represented separately, although they are so combined as to be placed by the side of each other, between the plate and the dial.

In the drawings, fig. 1 is a plan of the chronograph mechanism with minute indicator during its working, fig. 2 is a plan of the repeating mechanism at rest. In fig. 1, the bridges or bearings for the levers and springs are not indicated, so that the lower parts of the mechanism may be visible.

In all the figures similar letters refer to similar pieces.

The novel parts of the chronograph mechanism are the disengaging gear and the mechanism producing the jumping of the hand of the minute indicator.

The star or click wheel (fig. 1) acts upon a double-armed lever *B*, which is acted upon by a spring *b*. When the short end of *B* is raised by a solid part of the click wheel, its other end presses upon a bevelled projection of the lever *C* ; when the short end of *B* falls into the star wheel, its longer end leaves the projection, and the lever *C*, formed like a spring, is raised and raises the wheel *D*, which turns freely upon the axis, but is always in gear with the seconds wheel *F*. The top of the wheel *D* carries a pin, which engages in a vertical toothed ratchet on the underside of the wheel *G*, when the wheel *D* is raised by means of the lever *C*. Then the wheel *G* is obliged to turn with *D*, and drives, at the same time, the chronograph wheel *H*.

A break *I*, with spring, works in the same manner as in the usual chronographs, and stops the centre wheel *H* at the very moment the said wheel is thrown out of gear with wheel *G*, and a lever *J*, with spring, sets the chronograph hand back to twelve o'clock.

The push-piece lever *K*, with click and spring, is of the usual arrangement ; its purpose is to cause the star wheel to advance one tooth at each depression of the push piece.

The mechanism of the minute indicator is acted upon by the snail *L*, fixed upon the chronograph wheel and turning once every minute. A double-armed lever *M*, which oscillates around the screw and bears at one end a click *N*, formed like a fork, is pressed by a spring against the snail. At each turn of the chronograph wheel, the lever *M*, and its click *N*, are raised once and fall suddenly back into their lowest position, so as to cause the indicator wheel *O*, which carries the minute hand, to advance one tooth.

The forked form of click *N* has for its object to allow the click to be raised a sufficient height so as to strike the teeth of *O* with great impact, and without the risk of the hand being accidentally advanced more than one tooth. For this purpose, the longest branch of the fork bears against the pin of the piece *P*.

When the minute indicator is stopped, the same pin withdraws the click *N* out of gear with the wheel *O*. A spring *Q*, with bevelled-shaped head, bears against the teeth of the latter, and regulates its advance tooth by tooth.

The pin has a third purpose ; it prevents the jumping of more than one tooth of *O* at every stroke of *N*. The shorter branch of the fork bears against the said pin as soon as the click has produced the advance of one tooth, and prevents the jumping of a second tooth of *O*.

The double-armed lever *S* bears against the star wheel, and acts upon the lever *R*, the spring of which causes the same to strike upon a heart-shaped piece, not seen in the drawing, but placed underneath the wheel *O*, for the purpose of setting the hand of the minute indicator to 0 (that is to say, to 60).

The repeating mechanism consists of a special spring barrel A^1 (fig. 2), which is wound up every time it is desired that the watch should strike the hour, and only to such an extent as to correspond with the hour indicated at that moment by the watch.

By drawing out the piece C^1, the rack B^1, the teeth of which engage in the pinion of the spring barrel A^1, is caused to wind up the said barrel.

The axis of the spring barrel A^1 carries a wheel D^1, the teeth of which are formed for the purpose of striking the hours and the quarters by acting upon the pieces E^1 and F^1, carrying the hammers G^1 (of the hours) and H^1 of the quarters. U^1 and V^1

are the movers of the repeating escapement; they are acted upon by the toothed range of the barrel A^1, placed underneath the plate, but not visible in the drawing.

At the exact moment the watch has fully struck the hour, the end of the quarter piece L engages in the teeth of U^1, and the escapement is stopped.

When the piece C^1 is pushed in the direction indicated by the arrow in fig. 2, the barrel A^1 and the wheel D^1 are turned a certain amount by the arrangements hereinafter described, and when the piece C^1 is let go, the mainspring contained in A^1 causes the barrel and wheel D^1 to turn back and to strike the hours and quarters.

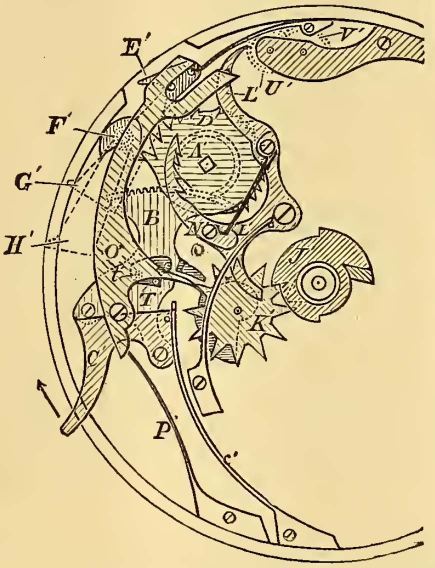


Fig. 2.

A special arrangement, also described hereinafter, allows the repeating mechanism to strike only when the piece C^1 has been drawn out to its fullest extent, so as to prevent incomplete striking. The watch strikes the hour perfectly, or it does not strike at all, according as to whether the piece C^1 is drawn out completely or partially.

The canon of the minute wheel carries the snail wheel J^1 of the quarters, with the surprise and finger as in the ordinary repeating mechanism. At every turn of the minute hand, the finger causes the star wheel K^1, with twelve points, bearing the hour snail wheel, to advance one tooth.

As in well-known repeating mechanism, the steps of the snail wheels of the hours and of the quarters determine the number of teeth of the wheel D^1, which act upon the hammers G^1 and H^1.

The arm of the rack B^1 strikes upon the hour snail wheel, and causes the barrel A^1 to be wound up, more or less, according to the position of the hour snail wheel.

On the other hand, the quarter piece L^1, oscillating around the screw, and the arm of which bears upon the quarter snail wheel, carries a rack N^1, provided with four teeth, which, according to the position of the quarter snail wheel, is placed in four different positions. In the first position the pin, which is fixed to the wheel D^1, takes into the first notch of N^1; in the second position the pin takes into the second notch; in the third position into the third notch; and in the fourth position into the fourth notch. According to one or the other of these combinations, the turning back of the wheel D^1 is limited so as to have one, two, three, or no quarter, struck.

The forked lever O^1 is specially destined to prevent imperfect striking of the repeating mechanism when the piece C^1 is not drawn out to its fullest extent. Its pivot is a screw fixed to a bearing, not indicated in the drawing.

A spring P^1 acts upon the lever O^1 for the purpose of maintaining the same in the position shown in fig. 2. In this position the left arm of its fork bears against a pin fixed to the piece E^1, which carries the hour hammer, and maintains it in a position in which E^1 cannot be acted upon by the teeth of D^1, so as to allow the barrel A^1 to be wound up without having the teeth of D^1 acting upon the hammer G^1. On the other hand, the right arm of the fork bears against a pin, fixed to the quarter piece L^1, and prevents the same from falling down upon the quarters snail wheel. This position of the lever O^1, shown in fig. 2, prevents the striking of the repeating mechanism even when the piece C^1 is acted upon.

This position must therefore be changed at the exact moment that the piece C^1 is drawn out to its fullest extent, that is to say, as soon as the rack B^1 is stopped by one step of the hour snail wheel.

For this purpose the rack B^1 carries an arm sliding in a circular slide and carrying a pin playing in an opening.

A conical piece T^1 is fixed to B^1 by means of a screw, and carries a pin which maintains the arm of lever O^1 in the position shown in fig. 2. In this position the piece T^1, bearing against the pin, pushes the arm out of the rack B^1.

As soon as it strikes upon the hour snail wheel it is forced back in its slide, and the pin causes the piece T^1 to turn and to remove the lever O^1 by means of the pin. The lever O^1 then takes up the position it would be in when the repeating mechanism is ready to strike.

"Painted," or "Stained," Diamonds.

THE case heard on December 8, at the Marylebone Police Court, to which we referred in our last issue, was again brought before the Court on December 29. The police reports have already been fully circulated in the papers, and are of only general interest; but as the technical evidence has not been fully reported, and may be of interest to our readers, we append that of Mr. Streeter, who was one of the witnesses for the prosecution.

Mr. Streeter said he had been engaged for 30 or 40 years in valuing precious stones. He had made it a study. There were two kinds of diamonds, one straw and one white coloured. The ring produced he had seen before. It was a diamond—a yellow one—value per carat about £5, and weighed about six or seven carats. If it were a white diamond it would be worth about £25 to £35 per carat, and the stone might be heavier than it looked. A great deal depended on the "spread." The eardrops produced were of the same quality as the stone in the ring, and yellow coloured. The value would be rather less, say 10 per cent., because the stones were smaller. That would make them worth about £4 10s. per carat, and they were about seven to eight carats in weight. If they were white they would be worth about 200 guineas, or about £25 to £30 per carat. The half-hoop ring and lady's hairpin produced at present have the appearance of being pure white diamonds. In time the acid goes away or loses power by lapse of time. To the ordinary eye these looked like fine white diamonds. Witness had examined them attentively. They were coloured stones with a chemical applied to them. He could see the chemical now. In appearance they were worth 200 guineas, that is if they really were what they appeared to be. The ring, if the stones were coloured, would be worth about £35 to £40. The hairpin, if a true white diamond, would be worth about £25 per carat, and, as it weighed about five carats, would be worth £125. Knowing it to be painted it is worth about 4 guineas per carat, that is about £20. To the ordinary eye, and even to very clever judges, the painting was a very difficult thing to discover. The setting hid the paint, and it required a very practised eye to detect it. He had washed some stones himself. The acid turned a shade darker.

Cross-examined: It required a skilful and practised eye to detect it. He did not think putting the chemical on needed much experience or care. It must be put on the stones before they are set. Between 12 and 2 o'clock was the best time for judging the value of diamonds. The presence of chemicals on the half-hoop ring could just be detected. The ring first pledged, in his opinion, was about six or seven carats, and worth from £4 10s. to £5 per carat in the trade. The prices he had mentioned were all trade prices. For selling to any person a certain profit would be put on. The setting of the ring would cost quite £4. It was the same with the other articles produced. The earrings were worth about £25. If they were white they would be worth about £125.

In answer to Mr. De Rutzen, witness said this practice of manipulating diamonds had been known eighteen months or two years ago. A Frenchman or a foreigner first brought them over. A friend of witness' had bought £3,000 or £4,000 worth of them before it was found out.

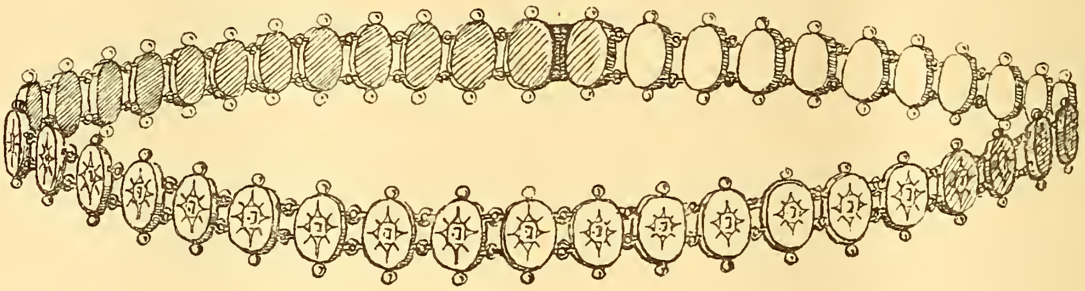
Birmingham News.

From Our Correspondent.

ALTHOUGH the general tone of business among the jewellers here is still hopeful, there are some expressions of disappointment at the fact of travellers having started again for the country without buying in the quantities usually expected at this time of the year, a sure sign that their stocks remain large, and consequently speculation is slow.

* * *

The great hope still lies in the Jubilee, and the work for the great event is swinging along merrily. I can hear of many instances of large and *bonâ fide* sales having been made of pretty silver goods; but the die sinkers and stampers find a grievance in the fact that the makers of gilt work have not yet taken up the spirit of the thing and gone in for new dies and tools. The fact is that the majority of the sales made at present have been all silver work. The goldsmiths are very reluctant about speculating in stocks which may possibly only be the fashion of a month; but still, if the goldsmiths will aim at something better in design than has prevailed for some years, there is yet a prosperous future before them. The public taste is very much dependent upon the quality of design which is put before them, and the sooner manufacturers see that large plain surfaces—as smooth and about as artistic as a skating rink—are not the acme of the jewellers' art, the better will it be for them and also for the public. I think, without doubt, that the year has opened with much promise for better things.



Here is an instance of the probable effect of the Jubilee on trade generally. A maker of fancy hardware goods informs me that he has booked an order for several thousand gross of small ornamental trays bearing a portrait of the Queen and other suitable devices. These are going to the colonies. If all branches of trade are similarly improved, the celebration will be one of the great blessings of modern times.

* * *

The steadiest branch of the jewellers' art is, and has been for the last few years, that of diamond mounting; and the cause is not far to seek, the stone bearing as it does an intrinsic value of its own far above most of the other gems. The diamond is regarded as a good investment for spare cash, and it certainly admits of a more artistic treatment than any other stone: harmonising with and yet never being outshone by the most brilliant of colours that it may become contrasted with, it is naturally a general favourite, and the price of the present day placing it within the reach of a class of buyers a *trifle* below kings and princes, it consequently finds a very large scope for its aims; add to this the fact that the best designers and workmen that can be got for money are enlisted into the cause and I think the problem is solved.

* * *

Just a remark apropos of the much vexed question of the Hall-marking of foreign watch cases, and in support of the English mark increasing the value of the same. There are now being imported into Coventry, by a firm of watchmakers there, numbers of Swiss cases unfinished (or "in the grey"); they are then sent to the London office as their own make, and, bearing the initials of the firm at Coventry, they are afterwards finished and fitted up with a cheap keyless movement, which is also imported, and thus, bearing the appearance of an English watch, they go into the market. Is it to be supposed that they are sold as a foreign make of watch? and is the English mark of no value in this case? I leave my readers to draw their own conclusions. This is a case in point which I think should alter the opinion of some of the opponents to the suggested alterations in the law; perhaps this and similar usage may account for the present outcry of no trade for the English watchmaker. I know of a firm in Birmingham who, believing necessity to be the mother of adaptation as well as invention, have successfully turned their watch machinery to account by making a patent electric lighter for the patentee and thus keeping up their full staff of workpeople.

* * *

To return to the jewellers; one of the prettiest branches of the trade, namely, enamelling and enamel painting, has experienced quite a revival during the last few months, such a stir in fact that it has not had for years: and many a muffle has been re-lit that had long been dark and cold, and many a home has been made happier and brighter in consequence—so we are all hoping that this very pretty art may again become fashionable.

* * *

The medallists—a branch of the trade which has increased considerably of late years, owing to the numerous demands of athletic clubs of various kinds—have turned their attention to the "great event," and the number of medals in preparation will be sufficient to satisfy all requirements: from the pewter, at a popular price for the million, to the more ambitious bronze, and the still higher class of silver and gold, some of which are real works of art and worthy to become a lasting and historical record of the prosperous and happy reign of our much beloved Queen.

* * *

The enterprising firm of Messrs. G. E. Walton & Co., Limited, Hylton Street, have opened a London branch at Holborn Viaduct, which is a step in the right direction, I think; and although they are one of the oldest houses in the trade it is evident they do not intend to rest upon their laurels.

* * *

The "gem setters," of whom there are a number here who "work out" for several firms, and whose abilities must consequently be very various, remain fully employed; and when such is the case a good workman can earn large wages, and doubtless some of them are "making hay while the sun shines" and preparing for a rainy day, for they are more dependent upon the fashion than the mounters, and when "set work" is out of fashion, as it was some few years ago, it is with difficulty they can turn to another branch.

* * *

The accompanying sketch is of a gold and diamond necklet of a simple but very effective design: it is composed of a series of coloured gold discs connected by small rings and worn somewhat tight round the top of a lace fichu; it has a very artistic and rich appearance and forms a considerable addition to a lady's evening toilet.

British Horological Institute.

THE half-yearly general meeting of the members of the Horological Institute was held on the 18th ult., under the presidency of Mr. John Jones, F.R.G.S., V.P. The secretary, Mr. F. J. Britten, read the report, from which we make the following abstracts :—

"It seems that a twelvemonth ago, when the Council had to submit a balance sheet showing an indebtedness to the Treasurer, they expressed a conviction that, notwithstanding the extreme depression of the trade, the substantial work of the Institute would ensure an income sufficient to meet all demands. Although the interim balance sheet published at Midsummer appeared to justify this view, there were some who looked forward with anxiety to the completion of the year for a more extended abstract on which to base their judgment. The Treasurer has now, however, a balance in hand of over £70. Much of the falling off in members' subscriptions noted in the Midsummer report has been made up, though the total amount received during the year from that source is a little less than was obtained in the previous twelvemonth. Quite a large increase is noted in the revenue from *The Horological Journal*, which continues to extend its circulation throughout the horological world in a remarkable way. This will be particularly gratifying to the older members, who will recollect that at the inception of the Institute, a journal which would disseminate technical information among apprentices and young members of the trade was looked upon as a valuable vehicle in the general scheme for the advancement of the horological arts. At that time there was no such publication in the English language ; the only horological serial being the respected *Revue Chronométrique* of M. Claudius Saunier.

"In the Midsummer report it was mentioned that owing to the dissolution of Parliament, all hope of immediate legislation for preventing the sale of foreign watches as English was destroyed. The Council held the view that any such deception would be rendered more difficult if the British Hall-marks, which are impressed on the cases while they are in course of manufacture, were confined to cases of British make, and the Council were supported in this view by the Conference held at the Institute in March. Since then the members of the trade in London, Coventry and Prescot have agitated for an enactment to prevent any movement or part of a movement, not of British production, from being placed in a British Hall-marked case. Though the Council are as anxious as ever to forward any measure calculated to benefit the trade generally, they felt unable to identify themselves with what they believe to be an impracticable proposal, and one which, if it could be carried out, would be injurious rather than beneficial to the English manufacturer.

"The whole of the educational work proceeds smoothly. The day and evening classes for practical work, and the winter course of evening classes for drawing and theory, continue as in former years. Of the 24 students who sat for the City and Guilds Examination, fourteen obtained certificates, and two of them medals and money prizes. The backwardness and want of diligence on the part of some of the students, mentioned in the last report of the class visitor, have been met by the introduction of more stringent rules for enforcing punctual and regular attendance. The Council believe that the reports at the end of the present session will show very satisfactory results therefrom.

"Mr. Samuel Jackson has followed up his generosity in giving a prize for the best account of horological tools at the late Inventions Exhibition, by placing five guineas at the disposal of the Council for the best tool or tools for watch jobbers. This, supplemented by a similar sum from Messrs. Henri Picard & Frère, has enabled the Council to offer two prizes under conditions published in *The Horological Journal* for December.

"There are at present on the books 451 members and fifteen associates ; and there is yet room on the roll of members for many prominent horologists, who would probably be willing to assist in the work of the Institute if its claims were brought to their notice by friends who already co-operate.

"The financial statement showed that the income for the whole year amounted to £1,240 and the disbursements to £1,166, leaving a balance of some £74."

The Chairman moved the adoption of the report, and having expressed his satisfaction at the great progress the Institute had made, referred to the question of the Hall-marking of foreign-made watch cases. He said he had had considerable doubt in his mind as to whether the Institute adopted a wise policy in taking up the Hall-marking question as they did. There were many British textile manufacturers who adapted to their own use the colours and designs of foreign countries for the purpose of competing in those countries with the goods manufactured there. If that was done by Englishmen, he could not see how English manufacturers could complain that foreigners endeavoured to adapt for their own use any of the forms, figures or marks employed by British watchmakers. If the English textile manufacturers used the foreign designs and colours, why should not the foreign watchmakers use the English marks and designs ? The question was, no doubt, raised by the English watch case makers, but he ventured to think that had they been employed to manufacture the cases by the foreigners they would not have objected. The casemakers were, in his opinion, pushing their doctrines with too much domination when they laid down that nothing should be put in English cases except something wholly made in England. With regard to the depression in trade, and the future of the watch trade, his opinion was that if it was to continue in Clerkenwell all classes of the trade must unite and work for their mutual benefit.

The motion was seconded by Mr. Glasgow, who, however, said he could not agree with the chairman in the opinion he had expressed upon the Hall-marking question. He considered that the English trade had suffered very severely from the system of putting foreign-made works into English Hall-marked cases.

The motion having been adopted, the officers of the Institute were reappointed, and a vote of thanks to the chairman closed the proceedings.

The Watch and Chronometer Trials at Kew Observatory during the Year ending October 31, 1886.

ABSTRACT FROM THE REPORT OF THE KEW COMMITTEE.*

THE arrangements for rating watches mentioned in previous reports have been continued during the year with great success, and up to the present 834 watches have been examined, of which 16 were submitted by the owners and 818 by the manufacturers or dealers.

Four hundred and ninety watches were received as contrasted with 302 received during the corresponding period of last year. They were entered for testing in the following classes :—

For Class A, 436 ; Class B, 36 ; and Class C, 18. Of these 148 failed to gain any certificate ; 16 passed in C, 102 in B, 224 in A, and 8 obtained the highest possible form of certificate, the Class A *especially good*.

All the watches which obtained Class A certificates had marks assigned to them, indicating the degree of relative efficiency they exhibited during their trial, according to the following scale :—

The number of marks awarded to a watch that only just succeeds in obtaining an A certificate is 0, while that awarded to an *absolutely perfect watch* would be 100, made up as follows :—40 for a complete absence of variation of daily rate, 40 for absolute freedom from change of rate with change of position, and 20 for perfect compensation for effects of temperature.

Below will be found a statement giving the results of trial of the 20 watches which obtained the highest number of marks during the year, the first position being again attained—with 86·7 marks—by the maker who occupied it—with 86·1 marks—last year.

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* The report did not reach us in time for publication in the January issue.—Ed.

The number of watches obtaining a high figure in the marks list has, however, much increased.

Results of Watch Trials. Performance of 20 Watches which obtained the highest number of marks during the year.

Watch deposited by	Number of Watch.	Balance Spring, &c.	Mean daily rate. — +Gaining. — Losing.	Mean variation of daily rate.	Mean change of rate for 1° F.	Difference between pendant up and dial up.	Difference of mean daily rate.			Difference between extremes of daily rate.	Marks awarded for			Total Marks. 0—100.	Character of test.
							Between pendant up and pendant right.	Between pendant up and pendant left.	Between dial up and dial down.		Daily variation of rate.	Change of rate with change of position.	Temperature compensation.		
			secs.	secs.	secs.	secs.	secs.	secs.	secs.	secs.					
E. F. Ashley, Clerkenwell ...	03385	Overcoil, fusee	+ 0·5	0·3	0·01	—0·9	—0·8	+1·9	—3·7	7·75	33·3	34·1	19·3	86·7	Class A.
Baume & Co., London.........	2163	Overcoil, going barrel.........	— 2·1	0·5	0·03	+3·4	—0·4	+0·2	—3·7	4·75	30·5	35·6	18·0	84·1	”
Parkinson and Frodsham, London	6660	Duo-in-Uno, fusee...............	— 0·1	0·4	0·07	—1·1	+1·8	—0·4	+1·3	5·75	31·2	37·1	15·3	83·6	”
Baume & Co., London.........	2160	Overcoil, going barrel.........	+ 0·2	0·4	0·03	—2·2	—4·7	—0·5	+3·6	7·25	32·6	32·9	17·7	83·2	”
Stauffer & Co., London	114322	Overcoil, going barrel.........	+ 2·0	0·4	0·05	+1·6	—2·6	+3·2	+1·3	7·75	32·2	32·5	16·5	81·2	”
Baume & Co., London.........	2272*	Overcoil, going barrel.........	+ 3·3	0·7	0·01	+2·0	+2·0	—0·5	—0·2	6·25	25·9	35·8	19·3	81·0	”
Baume & Co., London.........	2161	Overcoil, going barrel.........	+ 1·7	0·3	0·06	+2·4	—3·0	—4·4	—0·5	7·25	34·1	30·2	16·3	80·6	”
D. Buckney, London	12925	Overcoil, going barrel.........	— 1·2	0·6	0·08	+0·9	+0·7	+1·5	+0·4	7·5	27·5	38·4	14·3	80·2	”
D. Keys, London	15317	Overcoil, going barrel.........	— 3·6	0·6	0·07	+2·2	—2·2	+0·6	—2·4	5·25	28·6	35·8	15·6	80·0	”
Baume & Co., London.........	2159	Overcoil, going barrel.........	— 2·7	0·5	0·02	+3·7	—2·3	+1·5	+0·4	8·25	29·0	31·8	18·9	79·7	”
Holland, Rockferry	3576	Overcoil, fusee	— 1·0	0·5	0·06	+4·1	+0·8	+4·8	—0·4	7·5	30·8	32·7	16·0	79·5	”
Stauffer & Co., London	111115	Overcoil, going barrel.........	— 0·4	0·5	0·05	+0·6	—3·8	—3·9	—0·9	6·75	30·2	32·5	16·8	79·5	”
Manger & Co., London	6001	Overcoil, going barrel.........	— 1·8	0·6	0·03	+0·6	—2·0	+2·1	+2·5	8·25	27·4	34·0	18·0	79·4	”
Carley & Co., London	44568	Overcoil, going barrel.........	+ 3·1	0·6	0·05	+2·4	+1·4	—2·0	—1·2	6·5	27·6	35·0	16·7	79·3	”
Stauffer & Co., London	114318	Overcoil, going barrel.........	— 3·1	0·5	0·10	0·0	—2·4	+1·8	+0·5	7·75	29·5	36·2	13·4	79·1	”
Player, Coventry	13491	Overcoil, fusee	— 2·4	0·5	0·10	+1·3	+0·5	—2·9	—0·1	6·75	30·4	35·3	13·3	79·0	”
Usher & Cole, London.........	24044	Overcoil, going barrel.........	— 0·8	0·7	0·04	—1·4	—2·9	—4·1	—2·4	7·5	27·0	34·4	17·5	78·9	”
H. Golay, London...............	14693†	Overcoil, going barrel.........	+ 1·3	0·5	0·09	+1·3	—0·4	+3·7	+1·1	7·5	30·0	34·7	14·0	78·7	”
D. Buckney, London	12485	Overcoil, going barrel.........	— 0·7	0·6	0·08	+3·3	+3·5	—1·3	+2·0	6·0	28·4	35·4	14·8	78·6	”
Baume & Co., London.........	2343	Overcoil, going barrel.........	— 0·5	0·6	0·07	—1·5	—2·8	—3·8	+1·3	6·75	28·4	34·8	15·3	78·5	”

* Fly-back Chronograph. † Minute Repeater and Clock Watch.

Owing to the inconvenience and delay attendant on the employment of one safe for both hot and cold tests, a second was procured, and has been fitted up as a refrigerator, thereby enabling two sets of watch trials to proceed simultaneously, and more constant temperatures in both heat and cold to be sustained for the necessary periods.

Special attention has been given to the examination of *pocket chronographs*, in accordance with the request of the Cyclists' Union.

Manufacturers have also been advised of certain mechanical defects in the action of the chronograph work, and latterly an improvement has taken place in respect of this.

Early in the year a communication was received from the President of the Section d'Horlogerie de la Société des Arts à Genève, asking for full particulars of the system of rating at this Observatory. These were forwarded to him, and in acknowledging receipt of the same he expressed the gratification of his Council at the degree of accuracy obtained in the Kew trials during the year.

Rating of Chronometers.—Application having been made to the Committee to extend their system of watch rating to marine chronometers, arrangements were carried out for effecting this. A chronometer oven formerly constructed for the Testing Office of the Board of Trade, being unemployed, was obtained on loan from the Meteorological Council, in whose possession it was, and erected with the necessary gas fittings in the Thermograph Room of the Observatory.

The trials were commenced in August, and up to the present date 17 ordinary marine and 1 sidereal chronometer have been rated.

The Astronomer Royal having on inquiry certified as to the excellent working of Kullberg's temperature regulator in the chronometer oven at the Royal Observatory, Greenwich, the inventor has been instructed to fit a similar one to the Kew testing case.

A Richard Thermograph has also been procured, and is arranged to work in the case with the chronometers, so as to afford a continuous record of the temperatures which they have experienced during the whole of their trial.

The range of temperature from 55° to 85° F., to which the marine chronometers are submitted, has been decided upon after careful consideration, as being amply sufficient for determining the behaviour of chronometers under conditions to which they are usually exposed at sea, and no objections have yet been received from makers or others to the adoption of the above range.

The History and Object of Jewellery.

By John Jones, F.R.G.S., &c.

(Continued from page 157.)

Experience has found that the discovery of larger diamonds bears a fixed proportion to that of smaller, so that the price is regulated accordingly; the rule of calculation being, that as the square of the weights so must be the value. So jealous are the Indians of the size of their diamonds, that when they work them they make the facets follow the form in which the stone is found, be it a perfect or imperfect crystal; but rather than this small loss, they frequently are content with them unwrought. Stones of extraordinary size are claimed as the property of the Prince, and transmitted as heirlooms through generations; a small dot being made in some part of the stone by each possessor. The finest collection of gems in the world is in the possession of the Shah of Persia, obtained by the plunder of Delhi about two centuries ago. Cardinal Mazarin, in the reign of Louis XIV., was the first who wore a brilliant. This truly scientific arrangement is, therefore, but of modern invention. Extraordinary value attaches to some diamonds. The largest diamond in the world is in the possession of the Great Mogul: in form and size equal to half a hen's egg, weighing about 700 carats; supposing it to be worked and fine, giving £8 as the value of a single carat stone and applying the rule of geometrical progression, the result is enormous. The next in size is the Brazilian diamond in the possession of the King of Portugal, weighing 215 carats. The third is an Oriental diamond, bought by Catherine, Empress of Russia, for £90,000 and an annuity of £4,000. The fourth is the Pitt or Regent diamond, bought by the Duke of Orleans for £100,000, now in the crown of France. To those of merely material conceptions such values may be indications of folly; but to those who regard gems as symbols of ideas, as without doubt they have been and even now are held, money seems but a poor parallel. The supplies of Europe were chiefly drawn from Brazil. The famed mines of Golconda are no longer worked, and but a limited quantity, in value about £100,000 a year, is still sent from

Allahabad in Hindostan. The great influx of diamonds which followed their discovery in South America alarmed the holders about the year 1735, lest diamonds should become as plentiful as pebble stones. They fell greatly in value, but have since regained their worth, and have for years maintained a value rather increasing than diminishing with the growing wealth of the world.

The preamble of an Act of the 6th, George II., states: "England being the market for diamonds and precious stones, whence most countries were supplied, and great numbers of rough diamonds being sent from abroad to be cut and polished here, which is a great advantage to the nation, and there being reason to believe that the trade would increase if the importation were free, be it therefore enacted that the duty be removed." The decline in prices had probably begun to be felt, and help was sought in legislation, though fruitlessly; for Holland has taken the whole trade, her water power giving her advantages which we have not, though the old English stones were cut with far better judgment than is shown in the modern Dutch ones.

As the diamond is the noblest of minerals, gold is the noblest of metals. The mixture of muriatic and nitric acids, by which alone it is dissolved, is called *aqua regia*, from its honourable service. Its distinguishing property is the extreme sub-division to which its atoms can be carried. To speak of its ductility would be but to repeat a well-known wonder—in a word, its divisibility is best shown by its being used as a transparent varnish over the daguerreotype pictures. As compared with other products, its tendency, like diamonds, is to rise in value. The supplies from newly discovered sources from time to time prevents the difference in value from being clearly felt. In the *Encyclopædia of France*, by Diderot, is a statement of the various modes in which gold can be coloured by alloys to imitate natural objects; the processes of artificial colouring to which gold is subject in ordinary manufacture are there explained.

The further detail of the materials of jewellery would draw out this paper beyond its assigned limits. The reader is referred to a work by the eminent mineralogist, the late Mr. Tennant, on minerals, as applicable to the jeweller's use.

An enumeration of some of the leading stones, with such parallelism as in modern days is frequent, has been selected from Dr. Croly's *Catiline.*

> "You shall have all that ever sparkled yet,
> And of the rarest; not an Afric king
> Shall wear one that you love. The Persian's brow,
> And the swart emperor's by the Indian stream,
> Shall wane beside you. You shall be a blaze
> Of rubies, your lips' rivals: topazes
> Like solid sunbeams; moony opals;
> Pearls, fit to be the ocean's lamps; brown hyacinths,
> Lost only in your tresses; chrysolites,
> Transparent gold; diamonds, like new-shot stars,
> Or brighter, like those eyes. You shall have all
> That ever lurked in Eastern mine, or paved
> With light the treasure chambers of the sea."

The jewellery of modern days is distinguished for an exquisiteness of finish which no former time has produced. From every style which the particular character of preceding nations has created, we are at liberty to borrow. The symbolism of Egypt, the elegance of Greece, the pomp of Rome, the mazy beauty of Arabia, the airy grace of Italy and France, are pressed into our service; and, though it must be confessed that the more imaginative Parisians excel in variety of pattern, yet even their patterns receive improvement at the hands of the English workman. The Goldsmiths' Co. exercises a small authority over the trade, but their surveillance is limited to the quality of the gold. Their noble resources would scarcely be diminished by the formation of a museum of ancient jewellery, valuable as a school for the apprentices of the trade and instructive generally in the history of the art; for jewellery is the mirror of the public feeling. In the plethora of wealth connected with railways, gold chains of extremely massive make came into fashion, but, with the reaction, lost their dimensions. In the institution of a museum they would but follow the example of some of the most noble of our aristocracy, with whom the trusteeship of property is so clear a principle that their mansions, replete with those works of art which wealth alone can obtain, are, under due regulations, open to public inspection.

No one did more to enhance the importance of this manufacture in this country than the late firm of Messrs. Rundell & Bridge. Their capital and judgment were employed in bringing the raw materials from the mines abroad, and, by their liberal employment of the highest taste, jewellery was produced of such magnificence as had never before been seen in the trade.

Such is a cursory exposition of the materials, forms and ideas contained in this comparatively unnoticed manufacture, jewellery. If modern rationalism object to some of the principles here exhibited, let it remember that it shuts out so many sources of pleasure, so many impulses to good; and, if the appeal to antiquity be considered overstrained, why, we ask, may not a science of colours be now for the first time constructed?

While public buildings are being decorated through means of colours, it would surely be a wise extension of the system to make them the vehicles of ideas. The love of nature has formed the theme of many in prose and verse, commended always for its purifying influences. Similar in result is the fondness for jewellery, judiciously selected, for the jewel casket presents perennial recollections of objects and ideas which pass away with the times and seasons. Titles of honour are regarded as ennobling their owners by urging them to be equal to their pretensions. Jewels, rightly judged, will operate similarly; for, with the principles here brought to light, the tiara of diamonds becomes the symbol of the incentive to virtue, and the use of artificial gems a still grosser hypocrisy. The slow elaboration of nature by which, from the rude mountain mass, through the lapse of ages, the perfect gem is crystalled, becomes invested with a more than scientific intent.

"*Parturiunt montes nascitur* 'GEMMA REFULGENS.'" And the jeweller again rises to be an auxiliar in that service by which man's nature is most truly ennobled. As in our lofty cathedrals the display of splendour excites respect, and the profusion of beauty delights the imagination, preparing the mind better for the service for which the building was reared, so the vanity to which jewels might minister, from their value or beauty, will be lost in the elevating influence of those higher principles which are their true intent.

John Jones.

Meetings of Societies, &c., for the Month.

Societies.	Feb.
Inventors' Institute, Lonsdale Chambers, Chancery Lane	7, 21
Photographic, 5*a*, Pall Mall East	8*
Society of Arts, John Street, Adelphi	2, 9, 16, 23
Geological, Burlington House	9, 18*, 23
Numismatic, 22, Albemarle Street	17
Mathematical, 22, Albemarle Street	10
Royal Astronomical, Burlington House	11*
Royal Meteorological, 30, Great George Street ...	16
Geologists' Association, University College	4
Royal Microscopical, King's College	9*
Quekett Microscopical Club, University College ...	11, 25*
British Archæological Association, 32, Sackville Street	23
Royal Archæological Institute, Oxford Mansion, Oxford Street, W.	3
Royal, Burlington House	3, 10, 17, 24
Antiquaries, Burlington House	3, 10, 17, 24
Physical, Science Schools, South Kensington	12*, 26

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* Anniversary Meetings.

The South African Gold Fields.

A CAPE correspondent, writing to the *Times* in reference to the above, says :—The development of the gold fields continues to absorb public attention. From every town and village in South Africa, during the last few weeks, a stream of fortune-seekers have wended their way to the De Kaap and Witwatersrand. The population of Barberton has more than doubled, and is daily increasing : stands for building and business sites are being eagerly purchased there, new syndicates are being formed, and new companies floated. The total capital of all the gold mining companies is stated to be not far short of £2,000,000, while their value, as represented by the ruling share prices, is nearly double that amount. In many cases the realisation of returns is a long way off, as there is no machinery immediately available for the development of the properties ; in other instances, some of the companies have been—even with very inadequate appliances—very successful ; and it is this, together with the handsome return from "company promoting," which has been the incentive to so much speculation.

The Sheba Reef Co. has presented a report to their shareholders giving the result of their first six months' working. It shows that they have crushed 771 tons, yielding 5,642 ozs. 16 dwt. 6 grs., an average of 7 ozs. 6 dwt. 9 grs. to the ton. The expenses incurred in the transport and treatment of this tonnage (exclusive of mining, which are nominal, the auriferous rock being simply quarried) were as follows :—Transport from mine to batteries, £1,689 5s.; crushing, £1,486 ; total, £3,175 5s.: a total of 82s. 4½d. per ton. Taking the value of gold here at 71s. per ounce, we have a gross return of £20,031 19s. 9d.; deduct expenses, £3,175 5s., leaving a balance of £16,856 14s. 9d. Out of this the shareholders have received in dividends 62½ per cent. on the paid-up capital of £15,000. With a view to avoiding the heavy charges for transport and crushing, the Sheba, in conjunction with the Oriental and Nil Desperandum Companies, has arranged for the construction of a tramway from their properties to the crushing mills sites, where they intend erecting at least 30 stamps to be driven by a turbine, to work up to 190 stamps ; and when this is completed the exceptional richness of the Sheba reef will be fully established.

Weekly shipments of native gold from the field may now be looked for—the Donald Currie steamer of this week taking 4,500 ozs., of the declared value of £17,150. For this present year the total export will be about £150,000 ; but next year, when several of the companies will fairly start work, it is estimated that it will advance to at least three-quarters of a million.

On the Witwatersrand fields, between Pretoria and Heidelberg, some of the capitalists of Kimberley have secured gold properties from which wonderful results are also expected. Mr. W. Knight, who has been long and favourably known in connection with successful mining enterprise at the Diamond Fields, has secured mining rights on the farm of Driefontein, where prospecting work has resulted in the discovery of four conglomerate gold-bearing reefs, giving together an average thickness of about 23 ft., extending over three-and-a-half miles in length, with a proved depth of about 100 ft. Adjacent to this, Messrs. Rhodes, Rudd and Caldecott have purchased for £10,000 the properties of Rietfontein and Witkoppies ; and several other syndicates and individuals have secured mining privileges in the same neighbourhood. When companies are organised and mills set to work it is expected that these fields will give an average return of an ounce per ton, and that the total cost of extracting the gold, mining royalties and other charges will not be more than 15s. per ton.

It is pretty well ascertained that the auriferous formation in the Transvaal runs across the country, almost along the parallel of 26° S., from the Lebombo mountains on the east to the boundary of British Bechuanaland on the west. The latest reef discovery has been on the Malmani River, near to Zeerust, and only fourteen miles from Mafeking.

At the Knysna, within the Cape Colony, it has now been established that gold-bearing quartz veins exist, although the few tests hitherto made have not given great results. From some of the surface quartz only 7 dwt. have been extracted, but selected specimens have yielded equal to 4 ozs. per ton. The Government is at the present time having a ton of the quartz crushed and assayed before determining whether the district of the Knysna will be proclaimed as a gold field or not. With the advantages of plentiful wood and water, and near proximity to an excellent port, the Knysna gold field may prove payable with a much smaller average result than attracts attention at De Kaap and Witwatersrand.

Gazette.

Partnerships Dissolved.

F. Williams & Co., Burry Port, Carmarthenshire, watch material dealers. Hughes & Turner, Warrington, file manufacturers. T. Mason & Co., Birmingham, jewellers. Harold Lawrence & Jones, Newport, Mon., metal brokers. Parker & Stone, Myddelton Street, Clerkenwell, goldsmiths. D. & A. Sutcliffe, Blackburn, pawnbrokers. Prosser & Davison, St. John Square, Clerkenwell, jewellers. J. Cheshire & A. Bindschadler, Birmingham, the Archimedean Manufacturing Co. Causnett & Leadley, Birmingham, brassfounders. Bourne & O'Neill, Birmingham, electroplaters. Paulson & Co., Nottingham, pawnbrokers. J. Kirkwood & H. Gollan (trading as James Kirkwood), Glasgow, jewellers. Bruton & Boulter, Spencer Street, Clerkenwell, watch dial manufacturers. F. & Emma Flint, Clerkenwell Road, manufacturing jewellers.

THE BANKRUPTCY ACT, 1883.

Receiving Orders.

To surrender in London.—William Edward Carter, Cheapside and Regent Street, jeweller.

To surrender in the Country.—John Field, Bristol, jeweller. Alfred Wilcox, Birmingham, manufacturing jeweller. Benjamin Dobson, Weston-super-Mare, late watchmaker. Charles Taylor & William Taylor (trading as C. & W. Taylor), Coventry, watch manufacturers. Thomas Prescott, Prescot, Lancashire, watch material dealer. George Knight, Southsea, watchmaker. Arthur Henry Toy, Birmingham, brassfounder.

Public Examinations.

In London.—E. Frank (trading as E. Frank & Co.), Redcross Street, and Marquess Road, Canonbury, fancy goods importer ; February 4, at 12.

In the Country.—T. Prescott, Prescot, Lancashire, watch material dealer ; February 3, at 11.

Adjudications.

In the Country.—B. Dobson, Weston-super-Mare, late watchmaker. W. Rawlin, Newark-upon-Trent, watchmaker. T. Bulman, Newcastle-on-Tyne, wholesale dealer in fancy goods. J. Field, Bristol, jeweller. T. Prescott, Prescot, Lancashire, watch material dealer. G. Knight, Southsea, watchmaker.

Notices of Dividends.

In London.—F. H. Connell, High Road. Kilburn, watchmaker ; 1s. 2d., first and final ; any day (except Saturday), Chief Official Receiver, 33, Carey Street. M. Lazarus, Oxford Street, silversmith ; 5s., composition, first and final ; any day (except Saturday), Chief Official Receiver, 33, Carey Street. W. Yandell (trading as W. Yandell & Co.), St. John Street Road, Clerkenwell, watch manufacturer ; 3d., second and final ; any Wednesday, Seear, Hasluck & Co., 23, Holborn Viaduct. A. C. Thorpe (trading as A. C. Thorpe & Co.), Conduit Street, Regent Street, diamond merchant ; 1s. 3½d., second and final ; January 3, S. Slater, 32, Queen Victoria Street.

In the Country.—T. Gray, Leicester, watchmaker ; 2s. 3d., first and final ; December 31, 28, Friar Lane, Leicester. G. C. H. Best (trading as George Best), Cardiff, watchmaker ; ½d., final ; December 24, A. Martin, Birmingham. W. Newman, Birmingham, ivory button manufacturer ; ¼d., second and final ; January 20, 120, Colmore Row, Birmingham. T. Hauxworth (separate estate), Leeds, jeweller ; 7s. 4d., first and final ; January 29, 1, Bond Street, Leeds. G. H. Smith (trading as G. H. Smith & Co.), Liverpool, pawnbroker ; 5s. 6d., first ; any day, T. T. Rogers, Liverpool. H. Gilpin, Sheffield, jeweller ; 1s. 2¾d., first and final ; January 31, Official Receiver, Sheffield.

THE BANKRUPTCY ACT, 1869.

Declaration of Dividend.

Annie Jacobson, Oxford Street, dealer in works of art ; 1s. 6d., first and final ; any Wednesday, Seear, Hasluck & Co., Holborn Viaduct, City.

Commercial Failures.

According to *Kemp's Mercantile Gazette*, the number of Failures in England and Wales gazetted during the four weeks ending Saturday, December 25, 1886, was 385. The number in the corresponding four weeks of 1885 was 339, showing an increase of 46, being a net increase, in 1886, to date, of 482.

The failures were distributed among the following trades: and, for comparison, we give the number in each, in the corresponding weeks in 1884 and 1885:—

	1886	*1885*	*1884*
Building Trades - - - -	54	47	35
Chemists and Druggists - -	2	1	5
Coal and Mining Trades - - -	7	6	10
Corn, Cattle and Seed Trades - -	4	9	10
Drapery, Silk and Woollen Trades - -	37	33	34
Earthenware Trades - - - -	4	2	1
Farmers - - - - - - -	39	19	14
Furniture and Upholstery Trades - -	6	6	6
Grocery and Provision Trades - -	76	60	48
Hardware and Metal Trades - - -	16	13	4
Iron and Steel Trades - - - - -	4	6	16
Jewellery and Fancy Trades - - -	9	13	9
Leather and Coach Trades - - -	15	20	24
Merchants, Brokers and Agents - -	17	12	27
Printing and Stationery Trades - -	8	2	6
Wine, Spirit and Beer Trades- - -	25	27	37
Miscellaneous - - - - - -	62	63	46
Totals for England and Wales -	385	339	332
Scotland - - - - - - -	105	94	89
Ireland - - - - - - -	11	12	8
Totals for United Kingdom - -	501	445	429

The number of Bills of Sale published in England and Wales for the four weeks ending Saturday, December 25, was 1,094. The number in the corresponding four weeks of 1885 was 1,066, showing an increase of 28, being a net increase, in 1886, to date, of 394.

The number published in Ireland for the same four weeks was 74. The number in the corresponding four weeks of 1885 was 67, showing an increase of 7, being a net increase, in 1886, to date, of 112.

APPLICATIONS FOR LETTERS PATENT.

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

16,967. A. C. Howard, United States, for "Improvements in the construction of watchmen's time recorders." (Complete specification.) Dated December 28. 1886.

17,009. E. de Pass, a communication from Messrs. Favre Frères, Switzerland, for "Improvements in keyless watches," Dated December 28, 1886.

17,033. M. Cross and H. Antrobus, London, for "Improvements in joints and catches for the pins of brooches, shawl pins and the like." Dated December 29, 1886.

17,077. F. Bosshardt, a communication from S. Chambon and R. François, Italy, for "Improvements in clocks or watches, indicating the difference of time in the various parts of the Globe." Dated December 30, 1886.

17,093. C. C. Atchison, London, for "The 'Jubilee' bangle, bracelet or necklet." Dated December 30, 1886.

17,127. F. Marriott, London, for "Lighting clocks, timepieces, &c." Dated December 31, 1886.

17,131. T. Brown, London, for "An improved combination of bracelet and brooch, applicable to other purposes." Dated December 31, 1886.

17,153. A. Guye, London, for "Improvements in watches." Dated December 31, 1886.

221. L. E. Junod, London, for "Improvements in gauges for measuring the pivots and jewels of watches and other timekeepers." Dated January 6, 1887.

304. O. Zadig and E. Feldtmann, London, for "Improvements in the treatment of refractory ores for the extraction of gold, silver, copper or zinc, by thermo-hydro-electricity." Dated January 8, 1887.

567. J. Harrington, London, for "Improvements in chiming apparatus connected with and set in action by a clock." Dated January 13, 1887.

815. E. Read and A. W. Turner, Birmingham, for "Improvements in solitaires or studs." Dated January 19, 1887.

Correspondence.

All Letters for Publication to be addressed to the Editor *of* The Watchmaker, Jeweller and Silversmith, *Imperial Buildings Ludgate Circus, E.C.*

All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.

[HALL-MARKING FOREIGN WATCH CASES.]

To the Editor of *The Watchmaker, Jeweller and Silversmith.*

Sir,—Can you inform your readers what has become of the agitation in favour of confining the Hall-marking of watch cases to English-made work? It would seem that watchmakers have fallen into their old habit of making a futile and unprepared effort, and then fallen back again to the position of "as you were." The position is a familiar one. It is now nearly ten years since this question was on the very brink of solution, when the late Sir H. F. Jackson, then Member for Coventry, got a Committee of the House of Commons to investigate the matter, and as a result of that Committee prepared a Bill which was never submitted to Parliament. I believe the Bill had a second edition. This grand effort at doing nothing roused the latent though susceptible ambition of the Worshipful Company of Clockmakers, who applied to the Board of Trade to assist them in resuscitating some of their ancient privileges. They of course went on their own account, and of course failed; but the effort was so exhausting that they have not yet quite recovered from it. The recent deputation to the President of the Board of Trade promised great things, and what one would like to know is has it also collapsed. This deputation seemed in a hurry, and the only thing remarkable about it was the absence of any representatives of the watch manufacturers amongst them. The Clockmakers' Co., who may be considered in favour of this movement, are undoubtedly a power and worth consulting and enlisting in favour of such a movement. The Horological Institute was not represented on the deputation, and from a recent speech of a vice-president of that Institute it would seem that even that learned body was not all of the same mind. And again, the big firms, the machine men, the watchmakers for the million, who are supposed by so many people to be the saviours of the English trade, were conspicuous by their absence. Now, Sir, the moral I wish to point to is this, so long as we fight in this very fragmentary manner we shall not only be beaten but despised. The Knights of the Round Table have come to life again: is it possible to galvanise a failing industry by recurring to the past? If we cannot formulate our own wants and state our grievances, how can others understand them. I therefore propose that a few representative men be chosen from all branches of the watch trade, to meet round a round table and draw up a plan of campaign, stating clearly what the grievances are we are suffering from and suggesting legislation that will be simple and obvious to remedy them; presuming that the men so chosen should be really representative, and would consider the interest of all those engaged in the watch trade; their counsel and advice would be backed up by what is by no means an insignificant portion of the community and would have an undoubted weight in Parliament. But even if we failed in obtaining the legislation we asked for, we might free ourselves from the not unjust reproach of resembling a set of ill-conditioned children that squalled without knowing what for.

I am, Sir, yours, &c.,

"A Watch Jobber."

P.S.—I have looked for some reply to an excellent letter in your October number on this subject without finding one.

[BREGUET BALANCE SPRINGS.]

To the Editor of *The Watchmaker, Jeweller and Silversmith.*

Sir,—Just as the country has become flooded with cheap Swiss and American keyless watches of the vilest construction, which give the watch jobber an endless amount of trouble, we are threatened with a still greater infliction from the same quarter by the application of Breguet springs to medium and low priced goods. Why it should be thought necessary to use this particular spring, which requires such very delicate handling, in place of the flat one that gives such good results, and so seldom gets spoilt by the jobber, I am at a loss to conceive. The great variety of work a jobber is called upon to do makes it the more necessary that his future work should be simple and less difficult. There is no fear of retail watchmakers, who have had good and long experience at the board and at their counters, buying these Breguet sprung watches, as they well know the trouble and expense they will ultimately give to the jobber, himself and his customers. But it is to those in the trade who have not had the advantage of a good early practical training that I venture to offer this word of caution against buying them for stock. It is the constant aim of manufacturers of other machinery to produce it in its simplest possible form to do its work effectually, so that it shall not become deranged when it falls into unskilful hands to be repaired. Why should manufacturers of watches be working in the opposite, backward direction? It is unfortunate some of the manufacturers of watches have not the experience of retailers; if they had, they would doubtless produce goods with a view to giving us as little trouble as possible—this is what we want. They should never lose sight of the men into whose hands watches must necessarily come to be repaired and cleaned; and, above all, bear in mind that the watch jobber is an all round workman, not a machine minder or specialist, working on any one branch all his life. If other practical men will give their views (by your courtesy in this journal) upon the subject of cheap keyless watches and Breguet springs, it may be interesting to the trade generally.

I am, your obedient servant,

J. D. Fisher.

Lincoln, *January* 18, 1887.

To the Editor of *The Watchmaker, Jeweller and Silversmith.*

Dear Sir,—A friend of mine has a very old clock in his possession, and he wishes to find out the date it was made, if possible. The names on the face are Daniel Quare, Stephen Husman, 259. I enclose his description of it, and would be glad if you could find out for me the year about which it was made.

Yours truly,

H. D. Waters.

Coventry, *January* 12.

[Daniel Quare was born in 1632, and died in 1724; the description of the clock points to its having been made about the end of the seventeenth century.—Ed.]

Buyers' Guide.

The Sheffield Smelting Company, Sheffield, *Sell* Gold and Silver (pure and alloyed). *Buy* all materials containing Gold and Silver.

F. W. Powell, Jeweller and Silversmith (Manufacturing), 23, Great Sutton Street, Clerkenwell, E.C. Wholesale only for Gold and Silver Jewellery; Silver Cigar, Cigarette and Card Cases, Match Boxes, Salt Cellars; Silver and Glass Smelling Bottles; Sovereign Purses.

Jones, E. A., Wholesale Manufacturer of Whitby Jet Ornaments. A Large Assortment of the Newest Patterns always in Stock. Export Orders promptly executed. Persons not having an account open will avoid delay by forwarding a reference with their order. Customers' Matchings and Repairs with despatch. 93, Hatton Garden, London, E.C.

For cheap, quick, reliable Watch and Jewellery Repairs, by the most Experienced Workmen, send to ALEXANDER EDWARDS, Watch Material and Tool Dealer, 88 & 89, Craven Street, and 2, Holyhead Road, Coventry. Lists: all Horological Literature.

M. W. Skelton, Inventor and Manufacturer of Fusee Keyless and other Watches, Liverpool. Manufactory: 6, Park Place. New Wheels and Pinions. Conversions and Jobbing done in general for the trade. Country orders promptly attended to.

WANTED.

A MOST conscientious WATCH MANUFACTURER at Bienne, Switzerland, who has a thorough knowledge of the article, and from an experience of many years is thoroughly acquainted with the English style, who has vast premises and a number of first-rate workmen at his disposition, wishes to enter into BUSINESS RELATIONS with a large and conscientious WHOLESALE BUSINESS IN ENGLAND, in order to supply the same with GENEVA WATCHES. Offers to be addressed H. 1546, to Haasenstein & Vogler, Editors in Basel, Switzerland.—[Advt.]

TO BE SOLD.

VALUABLE OLD-ESTABLISHED WHOLESALE WATCH, CLOCK AND MATERIAL BUSINESS FOR SALE.—The Stock and Goodwill of that well-known Business at present carried on by W. Dunningham & Co., 78, Union Street, Aberdeen (formerly D. Gill & Son), with large Repairing Trade. Established over 150 years. Further particulars on application.—[Advt.]

TO BE SOLD CHEAP, some good SECOND-HAND ENGLISH LEVER WATCHES, by well-known London, Liverpool and other makers. All have been put into first-class order, steel works, &c., re-polished and plates regilt, and are in new Silver Cases. Open Face and Hunting. Apply to Thomas Howard, Watch Manufacturer, 157, Kirkdale Road, Liverpool.—[Advt.]

The Watchmaker, Jeweller and Silversmith.

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The Watchmaker, Jeweller and Silversmith.

A Monthly Journal devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

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AGENT FOR THE AUSTRALIAN COLONIES:
EVAN JONES,
Hunter Street and Royal Arcade, Sydney, N.S.W.

Editorial.

SOME time since we had occasion to protest against the misrepresentations that were so continually being made respecting the condition of the English watch trade, and the system of manufacture pursued here as compared with that of other countries, by gentlemen having an exceedingly slight and superficial knowledge of the subject. The negative kind of information possessed by these amateur exponents was, however, to a certain extent, an excuse for their misstatements, and they were doubtlessly under the impression that they were imparting valuable instruction to their hearers and readers.

Without altogether endorsing Carlyle's estimate of the intelligence of the majority of his fellow-countrymen, it would be going too far to expect them to understand, or even to try to understand, the minutiæ of a particular industry.

Such assertions, involving, as they do, technical details, are, therefore, generally accepted by those they happen to reach in all good faith, without much inquiry as to their authenticity, and, consequently, if left unchallenged, do a proportionate amount of harm.

For the above reasons we considered it necessary to draw attention to the matter, hoping that our complaint would, at all events, have the effect of restraining others who might meditate a discursion in the same direction.

The recent agitation on the Hall-marking question, however, apparently aroused the some-time dormant activity of Sir John Bennett, who, in a letter to a leading daily paper, said the declarations of the English watchmakers were "all bosh." . . . "Swiss watches being better in quality and style," &c., &c.; and, under cover of an interview with a reporter of the *Pall Mall Gazette*, he has given an account of the cause of the existing depression of the trade, in what really amounts to a long indictment against English watchmakers, well calculated to make them —to use a modern colloquialism—"take a back seat," were they to attach any importance to either its source or inspiration.

The letter referred to was fully answered by a second letter, from a Vice-president of the Horological Institute (both being republished in our January issue), and, as certain allegations contained in the latter example of the "silver-haired knight's" philanthropic anxiety for the welfare of British horology were flatly contradicted by the Secretary of the same institution, we considered it inexpedient to notice it further in the pages of this journal, trusting to it dying the natural death it deserved.

The fortuitous reputation Sir John Bennett enjoys on the other side of the Channel has, however, led to its being translated, and published in some of the French papers; and, as it may be of interest to our readers, we give, in another column, a translation of a reply to the same which appears in a recent issue of the *Revue Chronométrique*, by Monsieur A. Redier, who is a high authority on Continental horology.

The references to the system of gauging pursued in France and Switzerland are particularly entertaining to those who hear so much of the superiority of Continental methods. But all will agree with M. Redier as to the desirability of uniformity in this respect.

In the course of his remarks, introducing the reader of a paper (Mr. T. Armstrong) on "The Condition of Applied Art in England, and the Education of the Art Workman," at the Society of Arts, last month, Sir Geo. Birdwood, the chairman, said the Great Exhibition of 1851 marked the real turning point in the history of English decorative art in the 19th century; that it was a terrible parade of our shortcomings, but its salutary lesson was at once grasped by us, and, in the aggressive spirit imbued into our blood and bone, we began that strenuous competition with the Continental manufacturers which has at last placed us, in the mechanical production of works of applied art, at the head of all the countries of the West. "The transformation was completed even by 1855, when the French began to recognise that we were no longer their humble tributaries, and were soon likely to become their most powerful rivals in every one of the special developments of the applied arts, of which they had so long enjoyed a virtual monopoly."

He stated that among the chief agents in this renewal of the artistic life of the country were the Science and Art Department at South Kensington, and such private organisations as the Scottish Art Union, the London Art Union and the Society of Arts.

But if we have progressed in every direction during the last 50 years, so have our Continental neighbours; and it will be quite impossible for us to maintain our proportional supremacy in the keen commercial competition with other nations, unless we can also maintain our staple export manufactures at the highest pitch of artistic as well as of mechanical excellence. The report of the Royal Commission on the Depression in Trade points most conclusively to the fact that, where we have lost ground in the markets of the world, it has been, in almost every case, due to our goods having depreciated in these latter qualities.

It is to be hoped that the tide of revival, of which there are not wanting many indications, will bring with it a healthier state of things, and that the future efforts of our manufacturers will be in the direction of emulating their competitors in the quality of their productions as well as the price.

General Notes.

In a letter addressed to the Académie des Sciences, and published in the *Comptes Rendus* for January 17 last, M. Em. Barbier thus explains a plan he has adopted for converting an ordinary keyless watch into a repeater:—" . . . At eight o'clock on the morning of December 24, I fully wound up my watch; the night following I wish to know the hour at which I awake, and on this occasion the winding up gives 90 clicks of the ratchet. Allowing, approximately, nine clicks for each 100 minutes, I assume the watch to have gone for 1,000 minutes, and that it is, therefore, 40 minutes past midnight. Later on, during the same night, a second re-winding gives eighteen clicks, and I calculate it to be four o'clock in the morning. I have found that, when the watch has been going

$$5{\cdot}3 + (n-1)\,[11{\cdot}19023-(n-1) \times 0{\cdot}00012] \text{ minutes,}$$

on re-winding it up, n clicks of the ratchet will be heard. This formula is correct to + ten seconds. As a repeater would be of no use to a deaf man, I will assume myself to be both blind and deaf, and premise that one of the 24 notches of the winding button is distinguishable by the touch from all the others. If, say, 40 of these notches correspond to 100 minutes' going of the watch, we have here another means of ascertaining the time." ! ! ! Now that keyless watches have come almost universally into use, we shall doubtlessly hear of this extremely simple plan being widely adopted, and the clumsy devices existing in the form of watches for the blind may safely be abandoned by makers in the future.

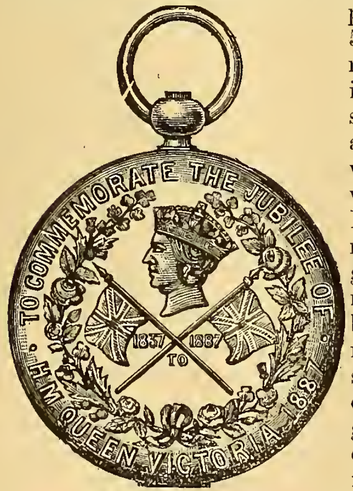
Heavy Failure in the Jewellery Trade.—The failure was announced at the London Bankruptcy Court, on the 25th ult., of William Henry Peake, manufacturing jeweller and diamond merchant, of Gerard Street, Soho, trading as "Grant & Peake." The liabilities are stated at £83,000, against assets £33,000. The Official Receiver appointed Monday, the last day of the month, at eleven o'clock, to hear an application for special manager.

The American Exhibition.—Mr. John R. Whitley, Chairman of the Executive Council, writing to remove a very general impression, states that the forthcoming American Exhibition, which is to open on May 2 next, is not under the management or control of the American Government, nor in any way connected with it, having been initiated and organised by a number of eminent and well-known American citizens, cordially aided on this side of the Atlantic by several Englishmen. Of the 25 officers, 21 are American. The idea of the Exhibition was conceived in America, the bulk of the working capital was supplied by Americans, and none but American exhibits are permitted. The object of the American Exhibition in London is to display in the metropolis of Great Britain, the chief market of the world, a more complete collection of the products of the soil and mine, and of the manufactures of the United States, than has ever been shown in Europe; to impress the millions of that continent and others with a sense of the magnitude and variety of America's industrial resources and the skill and ingenuity of its artisans; to increase the foreign trade of the United States wherever established, and to extend it into countries where at present it has no foothold; and, finally, to quicken the flow of foreign capital to America for the further development of its natural wealth and resources. At the invitation of a number of those who contributed to make the Centennial the success it was, the Board of Direction selected Philadelphia as the head-quarters in the United States, that it might profit by the valuable assistance of many who gained experience in the management of the Centennial International Exhibition of 1876. The American Exhibition in London is a natural sequence of that great gathering of ten years ago, and the Board intend it shall be no unworthy one, but one of which all Americans may be justly proud, and a source of pleasure and profit to Englishmen.

The Melbourne Exhibition.—The first meeting of the Commission of the Melbourne Centennial Exhibition was held on January 26, when it was decided that the Exhibition should be opened on August 1 next year, and should remain open for six months. The exhibits are to comprise processes of manufacture as well as finished articles. Space is to be provided free of charge, subject to the control of the Commission. The Exhibition will be open nightly, the art galleries being lighted by electricity.

Brussels Exhibition, 1888.—A Commission has been appointed to organise a "Grand Concours International des Sciences et de l'Industrie," to be held at Brussels in 1888, and a plan of classification and regulations has been printed. The galleries of the Concours International will consist of a series of special exhibitions, each of which will be devoted to objects of the same class. There will also be an Exhibition of Importation and Exportation, divided into five sections and fifteen groups. Conferences will be held in connection with the Concours. The buildings will cover double the space occupied by the National Exhibition of 1880. There will be 40 acres of gardens, illuminated at night by electric light, and containing cafés for concerts, restaurants of the different countries represented at the Exhibition, besides reproductions of celebrated ancient buildings. But the chief attraction will be a gigantic wooden tower, more than 900 feet in height, planned by Messrs. Hennebique & Néve. These gentlemen intend it as an example of the progress made in wooden building, too much neglected during the last 40 years in consequence of the almost exclusive use of iron and steel. They assert that their tower will occupy only one-fourth of the surface, and cost one-third of the sum required for the iron Eiffel tower that is to be the marvel of the Paris Exhibition of 1889. The cost will not exceed £80,000. A company will be formed to supply the capital, and a wealthy engineer, M. Somzée, one of the members for Brussels, is so sanguine as to the result that he has offered to subscribe for one-half of the sum. The building of the tower will supply employment for 1,000 workmen during a whole year. The tower will have a pyramidal base, surmounted by a spire divided into three galleries, like so many rings round a finger. The lower gallery, 3,000 feet in area, will be adapted for a kursaal, concert room, &c.; the second will form a belvedere with terraces; and the upper gallery will contain an observatory. Visitors will be conveyed upwards by seven lifts. The view from the top will embrace a panorama of 72 miles.

A Jubilee Purse.—Another addition to the numerous devices produced by our ingenious Birmingham manufacturers, for the purpose of commemorating the 50th anniversary of the Queen's reign, is shown in the annexed illustration. This purse resembles, in exterior appearance, a hunting watch, and is lined with satin. On the cover is a well executed head of Her Majesty, surrounded by an ornamental border, consisting of a graceful combination of the national floral emblems. It can be obtained in aluminum gold or nickel plated; and, from its suitability as a memento of the occasion, lowness of price and general utility, it will doubtlessly command a very large sale. The manufacturers are Messrs. C. Timings & Son, of 43, Spencer Street, Birmingham.



The businesses of Messrs. W. A. Carlyle, of Birmingham, and William Elmore, of London, manufacturers of dynamos and electro-plating plant, have been amalgamated, and a limited company formed under the style of Carlyle & Elmore (Limited). Business will be carried on at Constitution Hill, Birmingham, as heretofore.

The steam yacht "Chic," belonging to Messrs. Alley & McLellan, engineers, Glasgow, which has been berthed in the Greenock harbour for the past few weeks, has been fitted up with a Brush dynamo for the purpose of suiting her for the pearl fishing in Australian waters. The "Chic" will shortly leave for her destination.

The Queen has forwarded to Mrs. Kendal, at her residence in Harley Street, a beautiful brooch, the design being the Royal Crown composed of diamonds, rubies and sapphires. The gift is in remembrance of Mrs. Kendal's visit to Osborne on February 1, when she performed before Her Majesty and members of the Royal Family.

The first quicksilver ever extracted from the soil of Australia has just arrived in this country from the property of the Queensland Quicksilver Estate (Limited). The flask, containing some 70 or 80 lbs. of quicksilver, is for this reason somewhat of a curiosity, and it has been proposed to hand it over to the Imperial Jubilee Institute for preservation there. The latest advices from Mr. Tancred show that the works are proceeding with gratifying rapidity, and the company fully anticipate that within a year they will be able to execute orders to the extent of 100,000 flasks. What effect this will have upon the present monopoly in the quicksilver market remains to be seen.

The Gold Fields in Queensland.—The gold escort for February arrived at Normanton on 18th ult., with 7,000 ozs. of gold from the new gold field of Croydon in Northern Queensland.

Mother-o'-Pearl Shells.—The first series of public sales of the year, held on February 2, offered the extensive supply of 3,351 cases 125 casks 502 bags. Although the demand was slow, the bulk found buyers. The greater part again consisted of Australian, of which Sydney sold at a general reduction of 5s. to 10s., West Australian sold irregularly, and in most instances 10s. to 12s. 6d. lower, Fremantle showing a similar reduction. Black edged were neglected. Particulars of sales:—Of 2,333 cases 121 casks 12 boxes 64 bags Australian, about 2,100 cases 60 hogsheads 64 bags sold as follows:—Sydney (about 1,000 packages offered): bold and medium shells, fair to good chiefly clean at £7 to £7 17s. 6d.; more or less wormy backs, £6 12s. 6d. to £6 17s. 6d.; thin medium selected, £7 17s. 6d. to £9; ditto yellow edge, £7 12s. 6d. to £7 15s.; chicken, £8 to £8 10s.; inferior, £7 10s.; heavy bold wormy, defective, £3 7s. 6d. to £5 12s. 6d.; dead, 40s. to 70s.; broken, £4 5s. to £6 5s. West Australian, King George's Sound, &c., bold and medium, fair, chiefly clean, £6 to £6 15s.; more or less wormy backs, £5 10s. to £5 17s. 6d.; thin medium selected, £7 to £7 15s.; inferior and yellow edged, £6 12s. 6d. to £6 17s. 6d.; chicken, £7 2s. 6d. to £8 5s.; bold defective, £3 2s. 6d. to £4 7s. 6d.; dead, 45s.; pieces, £4 to £5 7s. 6d. Fremantle, bold and medium, part wormy backs, £5 15s. to £6 2s. 6d.; thin medium, £7 to £7 2s. 6d.; chicken, £7 10s. to £8 12s. 6d.; defective wormy, £3 2s. 6d. to £3 12s. 6d.; pieces, £4 17s. 6d. to £5 2s. 6d. 171 cases 57 bags black edged went off as follows:—139 unassorted cases clean Auckland bought in at 65s. to 80s. 13 cases West Australian chiefly sold: medium and small at 57s. 6d.; defective, 15s.; dead, 10s. 5 cases 56 bags Fiji sold: medium and small at 44s. to 50s.; blistered, &c., 5s. to 15s. 60 cases 9 casks 40 bags Shark's Bay chiefly sold: fair to good small at 25s. to 35s.; stout, 57s. per cwt.

Tortoiseshell.—At the periodical auctions held February 3 a good demand prevailed, shell selling at firm rates to an advance of 1s.; yellow-berry and hoof, 1s. to 2s. per lb. higher.

Croydon Civic Badges.—In place of the robes frequently worn on important municipal occasions, the aldermen and councillors of the borough of Croydon are adopting a very pretty civic badge, which has special and interesting features. It is in form and treatment in the Italian style. The beautiful enamelled shield of arms of the borough forms the central feature in each, with a wreath of laurel encircling it; over this is the severe cornice moulding, richly decorated, which is a fac-simile in miniature of the fine badge to the mayoral chain of the borough, as also the Italian scrolls above and at foot of the design. The civic coronet, being a reduced model of the *corona muralis* of the Romans, surmounts the ornament, which is suspended from a ribbon worn round the neck as a collar. The work is well executed by Messrs. T. & J. Bragg, of Birmingham, and the registered design furnished by them; Mr. A. Smith, of High Street, Croydon, having received the commission to supply what is a new departure in this kind of jewel.

The Queen's Visit to Birmingham.—The date of Her Majesty's visit to Birmingham has been altered from May 14, the day originally fixed. The precise day is not yet announced, but it will be on or about Friday, the 25th inst. A large fund is to be raised for the purpose of giving a suitable reception to the Queen, and to defray the cost of a statue of Her Majesty, or of some other personal memorial, which is to be placed in the new Law Courts as a record of the event.

Counterfeit Diamonds.—It is said that the manufacture of spurious diamonds, of the kind known as "doublets," is exceedingly ancient. The method of manufacturing them practised by the celebrated Zocolino was to procure a thin flake of an inferior stone, with as little colour as possible. As a bottom for the artificial gem he took a piece of crystal, and covered it with a transparent glue, in which was mixed the colouring material necessary to imitate the finest specimen. Upon this basis he superimposed the flake of the cheap diamond, and so artfully concealed the joining of the two that even the cleverest lapidaries were deceived.

The French Crown Jewels.—The Paris Correspondent of the *Daily News* telegraphs: May 12 is the date irrevocably fixed for the sale of the Crown jewels. They will be on view for a month before the auction, in the Pavillon de Flore. A catalogue is being made by the director of the National Printing Office, and salesmen specially appointed will be charged to put these historical gems up to auction.

The Diamond Market.—According to the latest reports from this centre, the market is by no means in so satisfactory a condition as sellers could desire. *Rough* is dear, and little business is being done in consequence. In the middle of the month many of the London buyers returned empty handed, notwithstanding there were the parcels of two mails to be dealt with. It is generally considered that the Kimberley people are mistaken in keeping up the prices in the face of such a slight demand. Some American firms are sending travellers to Japan to try and open up a trade there, which recent indications have shown would be of some importance. Although the month opened quietly in Paris, the market has steadily improved towards the end and a good number of parcels have been disposed of, mostly to American buyers, who are looking out for the best quality of stones. The steamers "Rosslyn Castle," "Moor," "Garth Castle" and "Trojan" arrived at Plymouth since our last report, bringing plentiful cargoes but high prices from the fields. Latest from Kimberley states, prices firm and all classes of goods in strong demand.

Silver.—The market has been weak throughout the month, under the influence of low exchange rates, and little business has been done. The closing prices were: for bars, $46\frac{11}{16}$d. per oz.; Mexican dollars, $45\frac{9}{16}$d. per oz.

American Items.

According to the *Jewelers' Weekly* a movement is on foot to establish a new method of selling gold cases. The plan is to establish a system of standard weights for each size case, springs, &c., not included, and to sell the cases at so much each, adding or deducting for variations from standard weight and charging extra for ornamentation; these prices to be under contract the same as now with movements. If this plan is adopted there will no longer be any inducement for the manufacturers to make cases with immense springs, or to cut down the finish or quality of gold, to enable them to compete with the poorly made and illegitimately stamped cases occasionally shown in the market at present. It is also proposed to adopt a system of uniform stamps for each quality of gold, to be used by *all manufacturers* and to be copyrighted, so that it will be impossible to defraud in the matter of quality. The following are a few extracts from a circular, setting forth the plan, which has just been addressed to the jobbing trade:—"In order to remove some of the obstacles to a new price list, we respectfully suggest that the gold case manufacturers adopt a system of standard weights for 4, 6, 8, 16 and 18-size carat cases, and make their prices at so much per case, based on these weights, charging extra for ornamentation according to pattern, and adding or deducting for variations from standard weights, as the case may be. We also, respectfully but earnestly, request that they adopt a uniform system of stamps for the various qualities of cases made by them, said stamps to be copyrighted and so advertised to the retail trade and the public as to make a demand for cases so stamped, which will make it difficult for any manufacturer to dispose of his goods who does not agree to this plan and use these stamps. We consider this matter a very desirable thing, even considered by itself."

The Canadian Pacific Railway, having adopted the 24-hour system, are about to give a heavy order for watches with 24-hour dials, for their employés.

Toronto jewellers are exceedingly wroth at the recent action of the American Customs' officers at Detroit. P. W. Ellis & Co. had shipped a heavy parcel of winter sports jewellery to Minneapolis, Minn. It was seized by the officials at Detroit, on the ground of alleged under-valuation. The firm complains that such was not the case, but that the United States authorities are actuated by jealousy at a Canadian firm's enterprise in exporting such goods into the States.

The Canadian agents of Joseph Rodgers & Sons, England, have entered an action against the Acme Silver Plate Co. for using the name of G. Rodgers on the plated ware they sell.

M. F. B. asks, in the *Scientific American*:—1. Is the time telegraphed from Washington the mean time of the 75th meridian from Greenwich, or the mean time of the meridian of the Washington Observatory? *A.* Time for railroads and most civil purposes is telegraphed from Washington to various stations, as New York, Cambridge, and Alleghany, and is the time for the 75th meridian from Greenwich. At these stations, time clocks are running in unison, and from them time is distributed to various points by the Western Union Telegraph. The time balls are dropped at New York, Philadelphia, Baltimore, Washington, Hampton Roads, Savannah, and New Orleans, by telegraph from the National Observatory. 2. Has the decision or recommendation of the late "Congress on the establishment of a first meridian," to begin the astronomical day with the civil day, been adopted by observatories and ephemerides generally? *A.* The recommendation in regard to the civil and astronomical unit has not been adopted by astronomers. It meets with some opposition, as its adoption makes a break in the continuity of record.

Birmingham News.

From Our Correspondent.

BUSINESS has been very unsettled here all through February. Manufacturing jewellers are waiting for a clearance in the commercial horizon; the number of failures (some of them being old houses of repute) that have come to light this month have done a great deal towards plunging the trade into its old state of despondency, and the rumours of other houses being shaky will prevent any good business being done here until the clouds are blown away and a fairer prospect appears. It is a matter of much regret when an old-established firm, trading on a large scale with the Cape and Canada—Messrs. J. Joseph & Son, St. Paul's Square, Birmingham—finds it necessary to file their petition in bankruptcy, with liabilities between £50,000 and £60,000; and although they estimate their assets to produce twenty shillings in the £, yet this is quite impossible unless the affair can be worked as a going concern until it is safe again: for we all know too well what realising on a stock of jewellery means. Well, all this only proves what I have stated, times without number, that the jewellers must shorten their credit system; and the sooner some of the leading manufacturers put a bold face upon the matter and unite and agree upon a reasonable amount of credit for accounts, the sooner the trade will pull together and cease to be the laughing-stock of business men. Of what other trade can it be said (as it is said of the jewellery trade) that a factor only requires premises with a big sign and an iron safe, and he can get credit without limit? It is this and the approbation system which are the curses of the trade, and will be so long as they are allowed to exist; it lies with the manufacturers themselves to alter it. Let some of the leading houses take the matter in hand and the smaller ones will be only too happy to follow, for they are getting their capital so locked up in the hands of the factors, that they scarcely know which way to turn.

* * *

The Limited Liability Company mania seems to be creeping into the jewellery trade here; we already have one instance of it, and I hear that another, a very old and extensive firm, are about to float their business as a Limited Company with a capital of about £60,000. Well, it is an experiment; the jewellery trade is so full of small and irritating details, which require a constant and careful supervision, that it is a matter of some doubt whether a company would be quite successful in this respect; but time will show. In the meantime, I have no doubt that plenty of money will be forthcoming from capitalists who still believe in the fiction of the "enormous profits made in the jewellery trade," and hope they will not be disappointed.

* * *

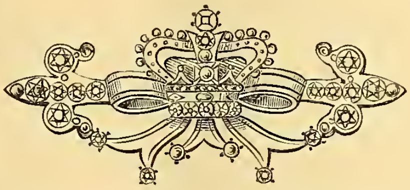
As I find that some of your readers have experienced considerable disappointment in regard to the registering of Jubilee designs—having gone to considerable expense in the way of drawings and workmanship, only to find that the Registration Office would not accept them—perhaps a short reference to the law on the subject would be acceptable. Any person may use the Royal Arms as an integral portion of a special design, but not generally or as a trade mark, under a penalty not exceeding £20. As to representations of the Queen, copyright portraits excepted, there are no restrictions, excepting that designs containing portraits of Her Majesty cannot be registered either as designs or trade marks. It is the ignorance of this fact that has caused the disappointments referred to.

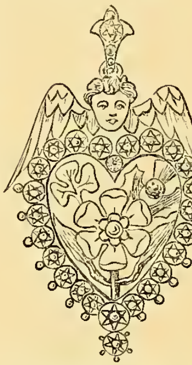
* * *

The jewellers, being very much dependent upon novelties and changes of fashion, are constantly on the look out for something new; and as the obtaining of new ideas and designs is a matter of some difficulty, I have promised the readers of *The Watchmaker, Jeweller and Silversmith* that I will bring before their notice any opening that I hear of for an article of personal adornment. "The latest," I believe, is to be the "Diamond Lace" (another chance for the diamond monsters); it is another and a very pretty form of the necklace of old, and as indicated by the name, lace, it is a flexible band of diamonds or other gems, arranged in such a manner as to enable it to be threaded through the interstices of a lace fichu and thus becomes a part of the dress; and a very beautiful idea it is, too, and one which will no doubt become popular.

* * *

These two small sketches are for gem ornaments of such design as can be worn either for Jubilee or ordinary wear, the brooch being a conventional arrangement of the crown supported by a bar terminating in the *fleur-de-lis*, with a gold and enamel ribbon binding them together; the pendant is a diamond heart, enclosing the emblems of the empire (rose, thistle and shamrock) and surmounted by a cherub in enamel. The designs both have a bearing upon the event of the year, but without being so conspicuous as the ordinary run of designs.





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The date of the Queen's visit to Birmingham having been altered to March 25, which is much earlier than expected, has caused a considerable rush in the removing of old buildings in Corporation Street to make room for the New Law Courts (the laying of the foundation-stone of which being the occasion of Her Majesty's visit), and the number of curious witnesses of the scene is very considerable.

* * *

The very valuable collection of cameo, intaglio, mosaic and other high-class art jewellery lately exhibited at Bingley Hall Exhibition, Birmingham, by Mr. B. W. Westwood, Warstone Lane, has been brought to the hammer; part of it was offered on Wednesday, February 23, and the remainder will be offered on Thursday, March 3, at Messrs. Ludlow, Roberts & Weller's sale rooms, 18, New Street, Birmingham. As Mr. Westwood has long been noted as a collector of this class of goods, and some of them are of a very high order, there will be opportunities for lovers of these beautiful specimens of the jeweller's art to become possessed of some excellent examples of antique and modern production.

Daring Robbery at a Jeweller's.—George Roberts, 24 a decent-looking man, describing himself as a compositor, was charged at Worship Street police court, on January 31, with feloniously breaking into the shop of Thomas Robert Walter, pawnbroker and jeweller, of 51, City Road, and stealing therefrom property valued at £44 15s. From the evidence of a man named George Solomon, it appeared that at about half-past ten o'clock on Saturday night the prisoner, who had been for some minutes standing at the window of the prosecutor's shop, was seen to raise both arms, and with his elbows batter in the large plate-glass window and rush off at the top of his speed. Frederick White, an assistant to the prosecutor, who had been in the shop, ran out on hearing the smash, and, with Solomon, pursued the prisoner. He was chased into a public-house in Leonard Street, Finsbury, and there caught. The prisoner said, "I acknowledge having done it, and I have the stuff in my possession." Then he took out of his pocket three gold necklets, a gold locket set with diamonds, and two gold bracelets. The prisoner, called on for his defence, said that he had no home and was starving. Some men had given him drink, and he had acted, he supposed, on a sudden impulse. Mr. Hannay committed the prisoner for trial.

English Horology.

(*Translated from the* Revue Chronométrique.)

A FRENCH paper has just published a sufficiently long article upon the decadence of English horology. This article, translated from the *Pall Mall Gazette*, repeats the views of M. Bennett, the famous horologer of the United Kingdom, and will astonish many of our *confrères*. It is full of errors and exaggerations, to which it will be well to call attention. It is nevertheless very curious, from more than one point of view, and will be read with interest.

Is it true that there are not made enough watches and chronometers in England to meet the demand? As many are made as formerly, and if foreign productions have invaded the English market, it is because there is a greater demand.

There are yet made magnificent, inimitable pinions, very excellent escapements in England. Cheap watch work alone cannot resist the competition of French and Swiss makers.

Can it be true that the most part of the old workmen are obliged to quit their profession for one inferior? They are replaced, says M. Bennett, by French or Swiss workmen, who, having served a better apprenticeship, are able to easily supplant them. This assertion may be disputed. The industrial side has made great progress on the Continent, and it is precisely on that account that the dexterity of hand is not so necessary as it was formerly. Apprenticeships are as short, unfortunately, in France as elsewhere, and we experience the same thing in Paris. As for the simplification of the trains, no one will mistake. They have been in nothing simplified, no more in France than elsewhere, and the almost general employment of the *remontoir* (keyless work) has complicated the mechanism in Switzerland as well as in England.

When M. Bennett speaks of the employment of the metrical system and its consequent advantages he adduces a great truth. Unfortunately in Switzerland, as elsewhere, the twelfths of the ligne are still the measure most generally employed in horology as the utmost precision.

Are we even agreed upon the sizes of screw threads? It should be that in the whole world the simple designation of a number assured the perfection of a thread. The unification of the pitch, metrical numbers indicating the diameters of the threads, the thickness of laminæ of brass or steel, have not made great progress, notwithstanding the serious efforts made by some devoted men in Switzerland.

Is it then from London that the stimulant should come to us? The English master makes no mistake when he develops the consequences of the employment of the metrical system in his country. In France, where we enjoy all its advantages, that which remains of old traces of the duodecimal system, causes us in many cases circumstances of great embarrassment. When then shall we finish, for good and all, with the lignes and their twelfths?

A. Redier.

Sir John Bennett and the English Watch Trade.

The following circular has just been issued by The London Watchmakers' Trade Association.

From *The Pall Mall Gazette*, December 28, 1886.

Sir,—In an article on the English watch trade, in your issue of the 13th inst., Sir John Bennett is quoted as saying the technical instruction carried on here is at best a feeble effort. Well, it is the most comprehensive our resources allow, and the taunt comes with an ill grace from the man who has never subscribed a penny for, or in any way assisted, our endeavour. When we were casting about for money to erect our modest building, a few earnest men among the leaders of the trade, remembering the many glib utterances of Sir John Bennett as to the necessity of technical education among watchmakers, waited upon him; but he, while admitting the excellence of the object, refused to contribute to the fund required.

I am, Sir, your obedient servant,
F. J. Britten, Secretary.
British Horological Institute.

Sir,—Some of the statements of Sir John Bennett show that his knowledge of the English watch trade is, to say the least, very superficial. Sir John Bennett says, that if he required a hundred English lever watches, he is not "quite sure" whether he could get them "even in Coventry." Side by side with this, we place a statement made by Mr. G. M. Whipple, the superintendent of the Royal Observatory at Kew, in a paper read at the Richmond Athenæum during the present year, on "Watches and their Behaviour." In this paper, speaking of a visit to our works, he says: "To give you an idea of the extent to which watch production was being pushed in this establishment, and worked by girls and women, I would state that, having adjusted the machinery for the production of one size and class of watch, they were constructing them in batches of 13,000 at a time, and the place was filled with boxes about the size of a tea chest, each full of one single component part of a watch." In support of Mr. Whipple's statement, we send you by this post a few photographs of the workshop which he described, wherein you will see that appliances and women's labour are employed in the English watch manufacture in even larger degree than by the Swiss. We may further say, as showing how antiquated and estranged Sir John's impressions are with regard to the English trade, that he ignores the fact that besides our own firm in Coventry there are three other watch manufactories in England where watchmaking is being conducted with the latest appliances, and women's labour and modern organisation, and that these firms are well known to be competing successfully with the foreigner in all those grades and styles which distinguish the English watch manufacture wherever a comparison of price and quality is in any way considered.

We are, Sir, your obedient servants,
Rotherham & Sons.
Coventry.

The Hall-marking Question.

MERCHANDISE MARKS ACT, 1887.

THE above, which has just been published, is a Bill to amend the Act of 1862. It was prepared and brought in by Baron H. De Worms, the Attorney-General, and Mr. Stuart Wortley; and the clauses which refer to watches may be considered as the outcome of the recent agitation and representations of the English trade.

Clause 8. *Application of the Act to Watches.*—Where a watch case has thereon any words or marks which constitute, or are by common repute considered as constituting, a description of the country in which the works of the watch were made, those words or marks shall, *primâ facie*, be deemed to be a description of that country within the meaning of the principal Act and this Act, and the provisions of the principal Act and this Act, with respect to goods with a covering to which a false description relating to the goods has been applied, and with respect to selling or exposing for sale goods with a false description, shall apply accordingly.

Clause 9. *Provision as to Marking Watch Cases.*—Whereas the marks placed upon watch cases by the assay offices in the United Kingdom have been frequently treated as indications of the British origin of the cases so marked, and also of the works contained therein, and for the purpose of preventing fraud in connection with watches, it is expedient to make further provision respecting the marks to be placed on watch cases; be it therefore enacted as follows:—

(1) When a watch case imported into the United Kingdom is sent to an assay office in the United Kingdom for the purpose of being assayed, stamped or marked, the assay office shall place on the case such a mark differing from the mark placed by the office on a watch case made in the United Kingdom, and in such a mode as may be from time to time directed by Order in Council.

(2) Every person who sends a watch case, whether imported or not, to any assay office in the United Kingdom, shall make a declaration as to the country of origin of the works which, according to the best of his information and belief, the case is intended to contain; and, where such a declaration is made, the assay office shall mark on the case, in addition to any other mark, such words indicating the country of origin of the works, and in such mode as may be from time to time directed by Order in Council.

(3) Any person who makes any such declaration falsely, shall be liable to punishment for perjury.

(4) In this section "country of origin" means the country where the works are made.

Clause 10 refers to the liability of offenders under the Acts to penalties, imprisonments and forfeiture.

Clause 11 provides that a defendant, and his wife or her husband, as the case may be, may be examined as a witness.

Clause 12 relates to the liability of accessories.

Clause 13. *Search Warrant.*—Where, upon information for an offence against the principal Act, as amended by this Act, a justice has issued either a summons requiring the defendant charged by such information to appear to answer to the same, or a warrant for the arrest of such defendant, and either the said justice, on or after issuing the summons or warrant, or any other justice, is satisfied by information on oath that there is reasonable cause to suspect that any goods or things, by means of or in relation to which such offence has been committed, are in any house or premises of the defendant, or otherwise in his possession or under his control in any place, such justice may issue a warrant under his hand by virtue of which it shall be lawful for any constable, named or referred to in the warrant, to enter such house, premises or place at any reasonable time by day, and to search there for and seize and take away those goods or things; and any goods or things seized under any such warrant shall be brought before a Court of Summary Jurisdiction for the purpose of its being determined whether the same are or are not liable to forfeiture under the principal Act or this Act.

The remaining clauses relate to Customs' regulations with respect to prohibition on importation, &c.; and definitions of the term "Summary Jurisdiction Acts" as applied to Scotland and Ireland.

The amendment as to false descriptions is dealt with in Clause 5; and as to selling goods with false descriptions in Cause 6.

The Bill may be purchased, either directly or through any bookseller, from Eyre & Spottiswoode, East Harding Street, Fleet Street, E.C., and 32, Abingdon Street, Westminster, S.W.; or Adam & Charles Black, North Bridge, Edinburgh; or Hodges, Figgis & Co., 104, Grafton Street, Dublin. Price 1½d.

Pearls are found in various kinds of shell-fish, in both fresh and salt water, in most parts of the world; but the pearl on which jewellers and their customers set the greatest store is to be got only in certain tracts in the Pacific and Indian Oceans. The busiest place for pearling seems to be the north-west coast of Australia.

Batteries for Electro-plating and Gilding.

By Robert Marshall.

Constancy is the chief requisite in a battery for this purpose. By constancy is meant invariability of electro-motive force during long working. There is no such thing as absolute constancy in batteries; the best obtainable vary considerably. The only single-fluid cell or battery having sufficient constancy for the object in hand, is that known as the Smee. Of the two-fluid cells or batteries, that known as the Daniell is by far the most constant, the cheapest and most convenient, and has been modified considerably to suit the various purposes to which it has been applied.

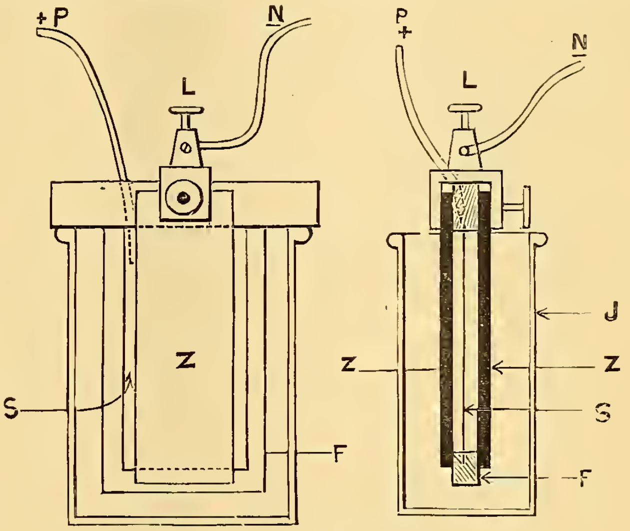


Fig. 1. The Smee Cell.

Fig. 1 shows the arrangement of the Smee cell in its most convenient form; J is a glass or earthenware jar which contains the exciting liquid, which, in this case, consists of sulphuric acid 1 part, water 10 parts; this may be varied somewhat, but 1 in 10 makes the best solution. F is a wooden frame which has been baked in paraffin wax to protect it from the action of the solution, the top bar being made longer than the bottom in order to sit upon the edges of the jar or vessel. This frame carries a thin sheet of silver, S, upon which has been deposited a black coating of metallic platinum. A copper wire is soldered to the silver sheet, and passes up through a hole in the top bar of the wooden frame, constituting the + or positive pole. The wire, solder and plate are carefully varnished, to protect them against the action of the solution or the fumes rising from same. Z Z

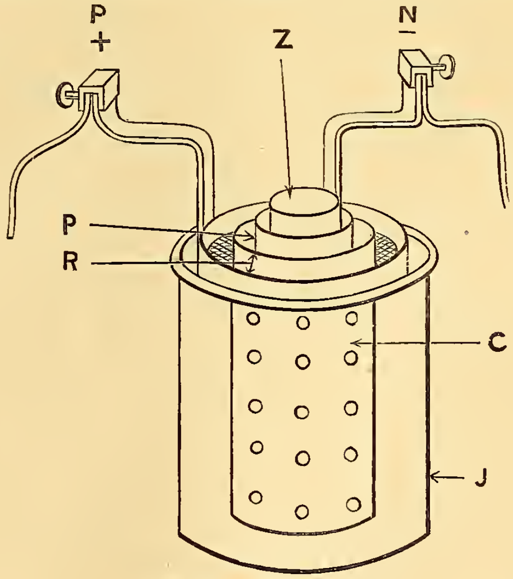


Fig. 2. The Daniell Cell.

are two zinc plates, the surfaces of which are well amalgamated with mercury. They are kept in the position shown in the illustration, that is, one on each side of the frame, by means of a brass clamp, L, from the binding screw of which a copper wire proceeds, which constitutes the — or negative pole. The most convenient form of jar or vessel for this battery, is one of oblong section, as here shown. It will be observed that the zinc plates are narrower than the silver plate; the object of this is to allow the bubbles of hydrogen gas, which are formed when the battery is in action, to escape freely from the silver plate. The zinc plates should be well amalgamated, by dipping them in sulphuric acid to remove grease and oxide coating, and the mercury should be rubbed on with a brush or with a piece of coarse flannel; it will be found to adhere readily. The object of the amalgamating is to increase the efficiency of the zinc plates. Zinc always contains impurities, such as iron, lead, &c. When the battery is in action, small local currents are set up where the impurities are, the plate becomes pitted and eaten away in parts, and the battery current is diminished: this is known as local action. When the plate is amalgamated, the mercury acts as a carrier of pure zinc to the surface, which, on being turned into the sulphate by the acid solution, is immediately replaced by a fresh supply, thus keeping the plate at its maximum efficiency. The deposit of black metallic platinum is formed as follows:—Rub the silver sheet lightly all over with a piece of fine sand paper; mount a porous jar within an ordinary jar, and fill both with dilute acid; attach a strip of zinc to the end of the wire which is soldered to the silver plate; immerse the silver plate in the outer jar and a small part of the zinc strip in the porous jar; pour into the outer jar a few drops of chloride of platinum. When the surface of the silver becomes discoloured, add a little more chloride of platinum, and press the zinc strip further into the porous jar, so as to put more surface into action. Gradually increase the zinc surface until a good black coating is obtained on the silver plate. The object in thus proceeding gradually is to obtain a strongly adherent coating, platinum being a very difficult metal to deposit firmly. Care must be taken not to handle the silver plate much, as the deposit is apt to rub off. When the battery is in action, the acid solution attacks the zinc, forming zinc sulphate $ZnSO_4$, and two atoms of hydrogen gas are set free at the silver plate; and unless this gas is given off it will accumulate on the plate in the form of minute bubbles: this is what is known as polarisation of the plate. If the plate becomes completely polarised the electric current stops. Smee discovered that rough surfaces disengaged hydrogen gas more readily than smooth ones, and hence conceived the idea of depositing a rough coating of metal on the negative plate; platinum being chosen, as this metal, in opposition to zinc, gives the highest electro-motive force.

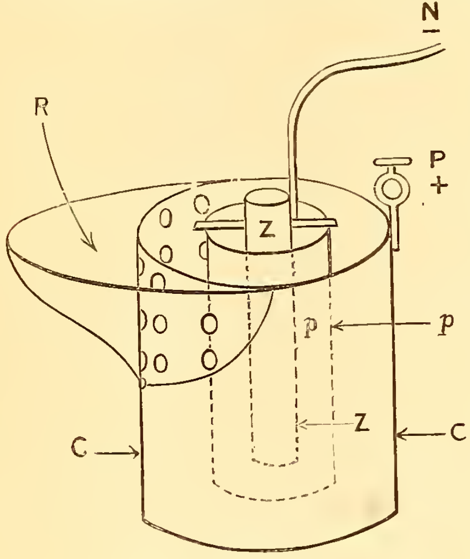


Fig. 3. The Daniell Cell.

The solution to be used for this cell is, as stated before, 1 of sulphuric acid to 10 of water, which may be varied up to 12 of water. When the battery is not in action the plates should be lifted out of the solution and immersed in water, or the solution may be decanted and replaced by clear water. The zinc plates should be examined and re-amalgamated if necessary. The brass clamp, L, should be examined before starting work, to see that clean metallic contact exists between it and the zinc plates, and also that the connection between the binding screw and the copper wire is good. The varnish on the soldered junction on the silver plate should be kept good.

The Daniell Cell.—This is a two-fluid battery, and certainly the most constant one known. Fig. 2 shows an ordinary form of this battery; J is a circular jar of glass or earthenware which holds a solution of sulphate of copper ($CuSO_4$); C is a perforated copper cylinder, to the upper end of which is attached a reservoir, R, to contain crystals of copper sulphate; P is a porous jar containing sulphuric acid solution, in which a rod of zinc, Z, is immersed. The connection to the copper cylinder forms the + or positive pole, and the connection to the zinc the — or negative pole.

As has already been stated in the description of the Smee cell, the formation of hydrogen gas at the negative plate tends to produce polarisation. To the elimination of this action the Daniell battery owes its constancy. At the negative plate—which is the copper in this instance—instead of hydrogen, copper is disengaged which adheres to the copper plate, thus continually renewing its surface: zinc sulphate is formed at the zinc plate. It will be found after a time that the sulphate of copper will pass through the porous jar and reach the zinc, where it will decompose and deposit particles of copper; this creates local currents, which soon destroy the zinc if it be not examined and the copper removed: this is the great defect in this cell. The copper plate and its solution remain constant if a reservoir be provided to contain crystals of the salt, to make good that which becomes decomposed; but the zinc requires attention. Fig. 3 shows another form of this cell: the jar containing the solution is in this case made of copper and provided with a reservoir, R, to contain the sulphate of copper crystals; *p* is a porous jar containing sulphuric acid solution, and Z is a zinc rod. The action is as before described.

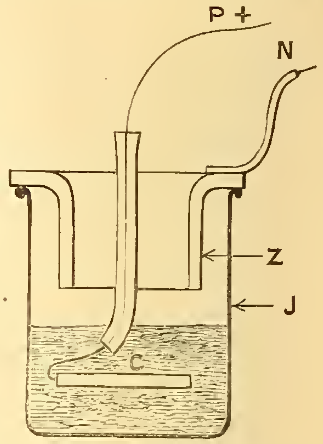


Fig. 4. The Callaud Cell.

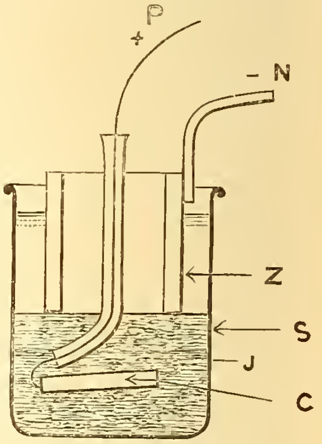


Fig. 5. The Menotti Cell.

Mr. J. T. Sprague, in his valuable work on electricity, suggests the use of a second porous jar, larger than the one containing the zinc, the space between the two porous jars being filled by a strong solution of zinc sulphate and a few zinc cuttings, for the purpose of throwing down the copper from any of the sulphate that may pass. The second porous jar containing the sulphate of zinc raises the internal resistance considerably, but the constancy of the battery is increased.

Fig. 4 illustrates the gravity battery of M. Callaud, of Nantes; J is the containing jar or vessel, in the bottom of which is a stratum of sulphate of copper crystals. In this stratum is buried a copper plate, C, to which is connected a copper wire, insulated by gutta-percha, as shown. A zinc cylinder, Z, is suspended in the vessel, which is then filled with water. The sulphuric acid, set free by the decomposition of the copper salt, rises and attacks the zinc, and the sulphate of zinc formed rests as a film above the crystals of copper sulphate.

Fig. 5 is the Menotti cell. This is very similar to the cell just described. Here the copper plate, C, lies upon a bed of crystals of copper sulphate, the connecting wire being insulated by gutta-percha, as before. Above the copper plate is a layer of sawdust or silver sand, S, on which the zinc cylinder, Z, rests: the jar is filled with water, as before. The layer, S, offers great resistance, and should, therefore, not be too thick.

Fig. 6 is the Bunsen cell, of much higher electro-motive force than those above described; it consists of a glass or earthenware jar, J; a porous jar, *p*; a zinc cylinder, Z; and a carbon rod, C: the connection to the carbon rod being the + or positive pole, and the connection to the zinc cylinder the — or negative pole. The porous jar containing the carbon is filled with strong nitric acid, and the solution contained in the outer jar holding the zinc consists of sulphuric acid 1, to water 10 to 12 parts. The Grove cell differs from this cell only in the nature of the negative element, which, instead of being carbon, is platinum, usually in the form of thin sheet or foil.

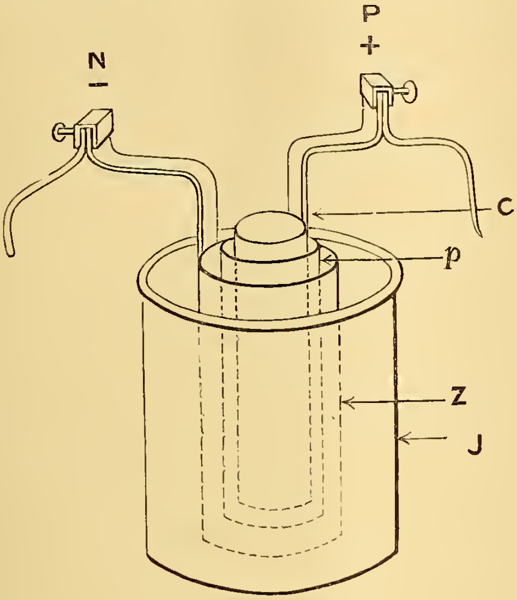


Fig. 6. The Bunsen Cell.

The porous jars used in these batteries should be of unglazed earthenware, thick and close-grained, and white in colour. They should be tested by filling with water and observing the dew formed on the outside: if it runs off, the jar should be rejected. The upper part should be glazed to prevent the liquids soaking up; or they can be varnished or rendered non-absorbent by soaking the ends in melted paraffin wax. When not in use, they should be kept standing in water, as they are apt to crack in drying.

New Book.

Screw Threads and methods of producing them. By Paul N. Hasluck. This little book contains a large amount of valuable and accurate information in a very small space, with numerous diagrams and tables for reference. It is well up to date, though a new American gauge and Wyke's numerical screw-cutting gauge (patented September 11, 1883) is not mentioned. Although the manual is, of course, written chiefly for the use of engineers and machinists, small screws have not been overlooked, and watch and clock makers will find a reference to this part of the work very instructive. The author takes the view urged by the Committee appointed by the British Association in 1881 to consider the subject, that the question whether an inch or a millimetre is taken as a standard of measurement in small screws is of no importance.

A Society has just been formed in Paris of goldsmiths and jewellers, for the purpose of bringing the manufacturer into direct contact with the public. It is entitled the French Alliance of Manufacturing Jewellers and Goldsmiths, and its offices are situated in the Rue Reaumur.

Mayoral Chain for Clitheroe.

In commemoration of the Jubilee year of the reign of Her Majesty Queen Victoria, a very special Mayoral chain and badge has been presented to the ancient borough of Clitheroe by Alderman William Garnett, J.P. The order was entrusted to Messrs. T. & J. Bragg, of Birmingham, and has been designed and carried out with due regard to the occasion. The work is in gold of 18-carat quality, each link of the chain Hall-marked, and the badge, which is in form of a Gothic quatrefoil with appropriate finials, affords in itself a summarised history of the borough. The old castle, now a weather-beaten ruin, but still a historic landmark, is indicated in the cognisance of the town as a bomb-proof fortress of the Norman period, with flying banners in its three towers, representing the cross of St. George. The descriptions of its early charters, with dates, are given in raised gold in the niches of the quatrefoil, and while the arms of the town are given in enamel on the obverse, the reverse is no less beautiful with the enamelled inscription in various colours in the gold. The centre link is remarkable for its expression of the gift as a Jubilee memorial, but especially from the exquisitely enamelled miniature portrait of the Queen, with the Royal supporters beside it, and surmounted by the Imperial crest. The chain is composed of a series of large links, harmonious with the Gothic spirit of the design, and united by smaller ones, with bold monograms, C. C., for the "Corporation of Clitheroe." These large links bear shields, surmounted by appropriate crowns or coronets, obverse and reverse, giving a connected history of the borough. The arms of the first Henry de Lucy, Earl of Lincoln, who granted a charter to Clitheroe, are followed by those of Edward III., confirming the same. Then come the armorial bearings of a number of Kings of England in succession up to King James I., those of the Duchy of Lancaster, of Dukes of Buccleuch, of the Recorder, of the Braddyll, and other ancient worthies of the district; of Mr. James Garnett, J.P., the present Mayor, for the ninth time serving that honourable office; and not least those of his brother, the donor. By a happy arrangement the shields at the back of the several coats-of-arms bear in enamel the description of the bearing on the obverse. The whole is carried out in the best style, and will form one of the most remarkable decorations which Messrs. Bragg have produced, and a fitting souvenir of the occasion.

A curious relic, called the Westminster Tobacco Box, has just been on view at the Westminster Town Hall. Originally this box was a common horn, presented to the overseers by one of their number in 1713, but it has so grown in size that it is now enclosed in five cases, the whole being covered with oak. The horn was capable of holding three ounces of tobacco, and the first recipients put a rim of silver about it bearing the donor's name. The next overseers placed a silver ornament on the lid; and another year a band of silver was attached to the sides. Then small silver plates were added, suitably inscribed or ornamented, until the box was entirely covered. An outer case was next manufactured, and, when that was covered with silver plates, other cases were made, until there were five in all. The outer case is now eighteen inches in height, and the oak pedestal and cover are capable of bearing 40 or more plates. Many of the silver plates are of considerable interest, because they bear a pictorial record of some event of importance. The silver plate attached in 1746-47 bears a portrait of the Duke of Cumberland, engraved by Hogarth in commemoration of the Battle of Culloden. Another bears the portrait of John Wilkes. Other engravings are well worth close examination. At one time the box narrowly escaped destruction at the hands of thieves, and upon another occasion an overseer refused to give it up. This led to a suit in Chancery, which cost the obstinate fellow about £500. The box was in 1860-61 examined by the Queen, and in 1877 it was exhibited at the Society of Antiquaries.

Aluminum.

THE importance of the discovery of M. Bourbouze, which we noted in our January issue, is at once apparent to metallurgists, to whom a means of obtaining a workable alloy of aluminum has long proved a puzzle. There is probably no problem which, while certainly capable of—or more properly perhaps adapted for—solution, has so long remained, as a contemporary observes, the El Dorado of chemists and metallurgists, as that of the introduction of metallic aluminum as an article for every-day use. While it remains at between 40s. and 50s. per lb., this consummation does not seem near, and it is not easy to know even now whether to regard pure aluminum as a precious metal or a curiosity of manufacture: probably in view of the quantity of jewellery and *objets d'art* which have been made with it, the former classification is the more correct, though it is not mentioned in the census relating to precious metals recently published by the Statistical Department of the United States. The intrinsic value of the pure aluminum made in France, which still remains the chief seat of its manufacture, cannot be regarded as considerable, and it is in the form of its alloys, which possess much value on account of their marked physical properties, that the value and immediate future of aluminum would seem to lie. In a paper read last year by Dr. Sterry Hunt before the American Institute of Mining Engineers, it is stated that remarkable results are obtained by alloying small quantities of aluminum with copper and nickel: one such compound broke at a strain of 49 tons to the square inch, with an elongation of 35 per cent., and a 10 per cent. aluminum bronze broke at 48 tons; such an alloy would be harder than gold alloyed for coinage, and would posses a specific gravity of about 7·8.

Some fifteen years ago a considerable quantity of pure aluminum was imported from France in the form of jewellery, but whether the quality was inferior, or whether it was too absolute a test of the question whether pure aluminum would withstand oxidation and other chemical influences, it is certain that, although in shops, the work looked extremely pretty, it failed to make headway, and distinctly suffered from tarnishing, and became brittle. This result was probably due to the action of atmospheric ammonia, as authorities are agreed that the metal withstands the action of acids better than alkalies. The aluminum industry, if the term be allowable, is more indebted to the late Emperor Napoleon than many people are aware; it was he who "retained" that eminent chemist and physicist, Henri St. Clair Deville, for the investigation of the problem of its production, with the result that the process devised by him, some 30 years ago, remains to this day the principal method of manufacture. In a shop in the Boulevard Poissonière, Paris, owned by the Société de l'Aluminum, may be seen the latest application of the metal. The Société does not manufacture, but is supplied under exclusive contract by M. Pechiney, of Salindres, and as recently as March, 1883, the late Mr. Weldon, F.R.S., spoke of M. Pechiney as the only commercial manufacturer of aluminum in the world. The process in use remains with but slight changes in detail as Deville left it, though such modifications have been introduced as to lower the price, which was quoted at £250 per cwt. in 1867, to £50 per cwt. in 1881. The price, however, has more than quadrupled since then if we may accept Mr. Nordenfelt's recent statement that he was not aware that aluminum could be bought at less than 48s. per lb. The most expensive part of the manufacture of the metal is the preparation of the anhydrous chloride and its subsequent reduction by sodium. Some three years ago there was a flutter in the metallurgical world consequent upon the pretended discovery of a process by which aluminum could be obtained at £100 per ton. On examination of the published details of the process, the fallacy was obvious: the new departure turned out to be in the preparation of the alumina used, and it was subsequently shown that the new method, so far from being less costly, was more costly; the collapse of the process as such was therefore the result.

The French method being of such historic interest may be described as follows:—Alumina is prepared by furnacing bauxite with carbonate of soda, dissolving out the soluble aluminate of soda, and treating this solution with carbonic acid; on washing the precipitate pure alumina will be obtained. This alumina is dried, heated strongly with carbon, and chlorine passed over the heated mixture; the chloride of aluminum is then decomposed by metallic sodium.

We repeat that this process is commercially successful, but when we consider that to reduce 1 lb. of aluminum from its chloride, about 3·5 lbs. of sodium are required, and that the sodium will cost at least 1s. per lb., we can understand the high cost of the finished metal. Mr. Weldon gave the figures representing the relative cost of the three operations on which the Deville process depends, as 9·67, 33·4 and 56·93 per cent. respectively of the total cost, so that the future of aluminum lies, either in cheap production of the haloid salts of aluminum and metallic sodium or the discovery of an entirely new process. Frischmuth's process has for its object the saving of this expensive item of sodium, and consists in producing sodium vapour direct from sodium salts and carbon. Considerable success seems to have attended this modification; and it is now, we believe, being worked at Philadelphia. Mr. Frischmuth made the cap of the Philadelphia monument, weighing $117\frac{1}{2}$ ozs.: this cap is spoken of as "huge;" it was to have been burnished, and was stated to be "going to shine like polished silver for ever."

It has for many years been regarded as entirely hopeless to attempt the direct reduction of compounds of alumina by carbon, and even Mr. Weldon stated that metallurgists might as well hope to get five from the product of two and two as to attempt it. Since, however, the supposed proof of the absurdity lay in certain physical laws of heat, of combination, &c., and we have no knowledge of how far those laws hold good at elevated temperatures, the objection has not, we think, much weight, and, without being wise after the event, the production of aluminum by the Cowles Electric Smelting Co., in which process, which was described in *Engineering*, vol. xiii., p. 39, only the direct reduction is mentioned, will seem to controvert the view which so many, in common with Mr. Weldon, held. It is well known that the temperature of the electric arc is the temperature of dissociation, and therefore alumina cannot exist in it. When to this the presence of carbon is added, we have conditions which upset theoretical considerations, and with suitable apparatus the production of aluminum is an accomplished fact. Seeing then that the direct reduction by carbon is effected by simply augmenting the heat, it follows that the production in a furnace, other than an electrical furnace, is within the bounds of possibility. It will be obvious that the reduction will be facilitated in certain cases by using other compounds than the oxide, and many patentees have built their hopes on these compounds. The double sulphide of aluminum and sodium produced by heating together carbon, sulphur, carbonate of soda and alumina, when highly heated with alumina, is said to set the metal free. Manganese will also reduce aluminum from its sulphide or haloid salt, displacing the sulphur, which goes off as sulphur. This reaction formed one of the last patents that Mr. Weldon took out, and he proposed to produce the sulphide, or haloid salts of aluminum, by the double decomposition of cryolite and the sulphide, chloride or iodide of either sodium or calcium. An interesting process, similar to the above, is described in *Dingl. Polyt. Journal*, cclii., pp. 515, 519, in which Herr Niewerth mixes ferro-silicon with cryolite in equal proportions and heats to fusion; volatile silicon fluoride is said to be formed, while the aluminum is left as an alloy with the iron. On fusing this with copper an aluminum bronze is obtained, and only a small amount of the aluminum is said to remain with the iron. It is an alloy of the metal and iron made by the Cowles Electric Smelting Co. which is used in the Mitis casting process. Its average composition is aluminum, 7·5 per cent.; silicon, $1\frac{1}{2}$ per cent.; carbon, about 4 per cent.

Such then is the position of the aluminum industry at the present time. We have pointed out that the resistance of the metal to oxidation has not been proved, nor will the mechanical properties as evidenced by the latest researches tend to strengthen the high opinion of its value, which in many cases has, we think, been exaggerated. Thus a wire of No. 18 gauge gave a strain averaging 7·9 tons per square inch; this is extremely low. Cast and hammered aluminum gave 7 tons; by cold hammering 13·2 tons could be obtained. Again, the latest determination of the specific gravity of aluminum is 2·583, which is higher than that generally ascribed to it. The difficulty of working aluminum is very great, and until two or three years ago no means were known for even soldering it, either to itself or other metals. Comparing these results with those obtained from its alloys, it would seem, as we have said, that the future of aluminum lay not so much in the preparation of the pure metal as in the production of its much more controllable alloys, some of which promise to possess a high value as constructive materials.

Watch Jobbing.

By X. O. N.

(Continued from page 154.)

IN the February number of this journal, a correspondent, Mr. J. D. Fisher, complains "that the country is being flooded with cheap Swiss and American keyless watches of the vilest construction;" he is apprehensive of a still greater infliction, the application of Breguet springs to this class of watches, and he asks for the "views of practical men on the subject of cheap keyless watches and Breguet springs." The subject of cheap keyless watches is one that practical men have little to do with, as, if the public like them and buy them, there are plenty of people in the world ready to supply the demand for cheap watches, or any other commodity whatever its character or quality; and although the application of Breguet springs to inferior watches is essentially a subject for practical men to deal with, I am afraid their application to the class of watches referred to is not the result of the decision of practical men as to the relative value of flat or Breguet springs, but is due to the law of demand and supply which govern the sale of cheap keyless watches.

There is no doubt that the Breguet or overcoil spring is one of the best forms, in fact the best form, of spring under certain conditions; and if the watch be of such a character in construction and finish as to justify or require its application—this fact being known and acknowledged gives a character to a watch worthy of imitation, and therefore it is something for a manufacturer or agent to point to—and as the action of the spring is easy and uniform the retailer or shopkeeper is taken with it and points to it in his turn as an excellence in the cheap watch he is recommending to his customer and in which he probably believes. As to his consideration for the comfort or convenience of the jobber into whose hands the watch may afterwards come for repairs, the thing is too absurd to be thought of; his business is to sell the watch. The Swiss have hitherto been the chief sinners in this affair of Breguet springs, and as they claim that great man Breguet as their countryman they may be excused for having a prejudice in favour of his invention; but it is useless to rail against the manufacturers of any article for making what they can sell. However great the excellence of a spring having the inherent quality of giving isochronal vibrations to the balance of a fine watch, it is no help to a watch with machine-made pivots and jewel holes, and such escapements as these watches generally have, especially when the overcoil is badly and unscientifically made so that each move of the index pins gives the spring a different form. But it is the business of the watch jobber to take things as they are, and to that end he should learn to make the best of them.

The manipulation of the balance spring is really the most important function of the watch jobber, and but for the fact that these springs can be bought ready to his hand, he would be under the necessity of learning to handle them with greater certainty and less trouble to himself. It is rather humiliating to be obliged to acknowledge that *nearly* all the balance springs applied to English watches are of foreign make.

Although the watch jobber is an all round man he ought to be able to pin in a spring flat and true and to correct or repair an injured one, as, no matter how perfect all the other parts of the watch may be, if the spring is bent or constrained in its action no correct time will be obtained from the watch. A flat or spiral spring should never be larger than half the diameter of the balance, that is if the spring has the coils close together such as are generally in use at present; but if a new spring is required for a job watch it must be of a size to suit the stud and index pins, and therefore if larger than this prescribed size the coils should be more open. If the old spring is only distorted, and not broken, a ready way of finding the strength of the new one is by lifting a small weight attached to the inner coil of the spring while the other end is held in the tweezers. This weight should consist of a small disc of brass having a pin about an inch long projecting through its centre; the pin should be tapered so as to make it as light as possible at the top, and have a small hook filed in it close to the disc sufficient to hold the inner coil of the spring while the weight is being lifted. It is easier to judge of the strength correctly if the weight be sufficient to draw the spring down the whole length of the pin, and for this purpose a few thin pieces of brass, that will drop over the pin and increase the weight to what is required, should be kept ready; by this means the strength of the old spring is easily gauged and a new one of the same strength as easily chosen. A very common and very uncertain method of finding the strength of a spring is by lifting, in a similar manner to what I have just described, the balance itself; the almost uselessness of this method is seen when we know that the diameter of the balance has as much to do with the time of the watch as its weight, and the diameter in this case counts for nothing. A spring should be chosen that will be rather smaller than the circle of the stud hole and index pins; that is, the spring should look small when the balance is at rest, as a spring this size has more freedom of the coils or at those parts of the coils that lie between the stud and the balance staff, and therefore assists in quickening the short arcs of the balance.

I think it is pretty well known that almost all ordinary watches go slower in the short arcs of the balance than in the long ones, or slower when the watch is hanging up than when it is lying down (this is especially the case with full-plate watches, and they, as a rule, have the balance springs too large). A spring collet should be as small as possible, and the inner coil of the spring just large enough to be free of the collet. If the hole in the collet is not straight, that is, tangential, it should be broached until it is so, and from the side from which the spring is inserted, as, if this is done, it will not be found necessary to bend the spring to suit a hole that is drilled anyhow; and, if the spring has to be unpinned, it must be bent again to suit another position.

If, when the spring is pinned to the collet, it stands away from it at the points where the pin is inserted, it will be useless to attempt to bring it closer to the collet by bending it on the collet; therefore, it must be unpinned, and the eye bent in a little, so as to get the centre true. When the spring runs true, the collet can be put on an arbor, and there is then very little trouble in getting it flat. I am now speaking of hardened and tempered springs, or those springs that are hardened by chemical process, and are more difficult to handle: soft springs can be bent to any shape or form. Some years ago, a prize essayist on the balance spring gave a few diagrams of springs, showing how they grew shorter as they grew older, and the way these springs were made to *do* was by a process known as white throating, that is, by scraping with a graver about an inch of the inside of the outer end of the spring to reduce its strength. This is complete botching, and the workman who resorts to it can have no respect for himself, and need not look for respect from others.

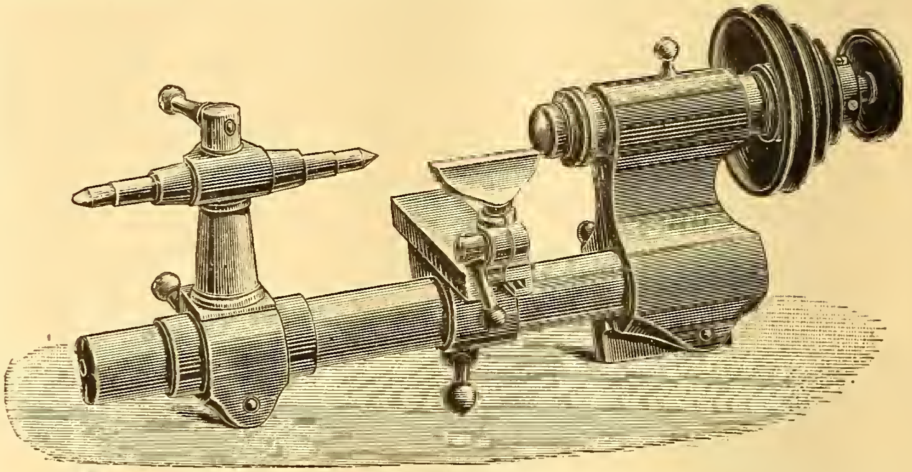
(To be continued.)

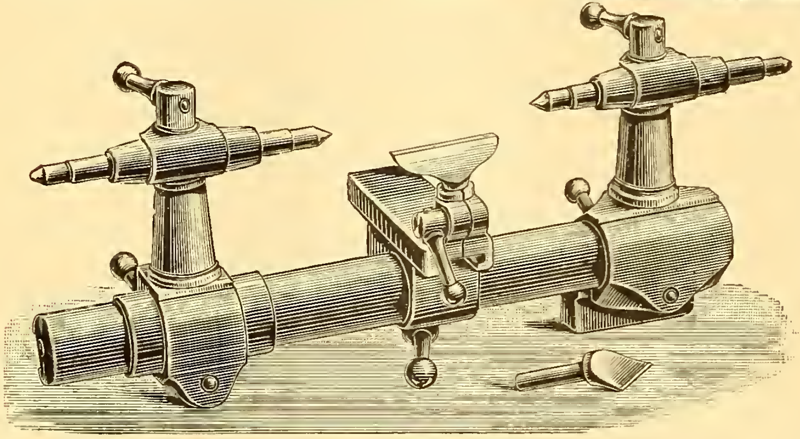
New Lathe.

OF the numerous appliances introduced of late years into the watch trade, more especially with a view to facilitate the replacement of parts and to supply the needs of the general repairer and examiner, there has been nothing to excel in superiority of work or adaptability the new watchmaker's lathe, known as "The Triumph."

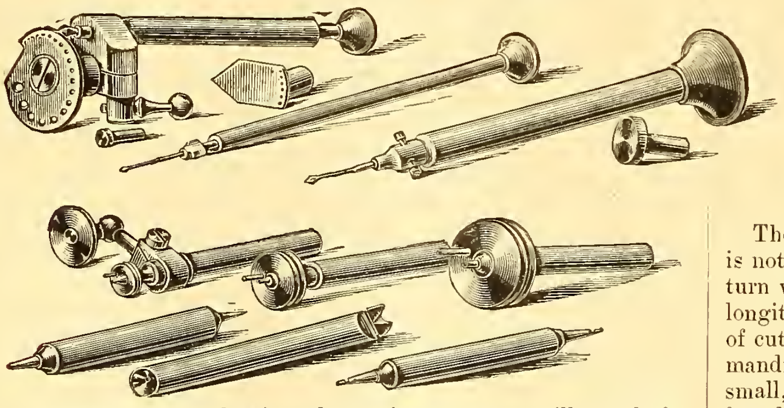
Like most of the new introductions, it is of German origin, combining some of the best American ideas. In a small compass there is comprised:—The turns, with all necessary runners, for turning, pivoting, centreing, drilling, &c.; the mandrel plate and dogs; and the lathe, with split chucks and step chucks, and slide rest of most admirable pattern. What is also of importance, the price is exceedingly low.

The prominent feature in this lathe is that the head and tail stocks, rests and all other parts, are made strictly interchangeable according to standard gauges, so that accessories can equally well fit any lathe, and separate parts can always be supplied.



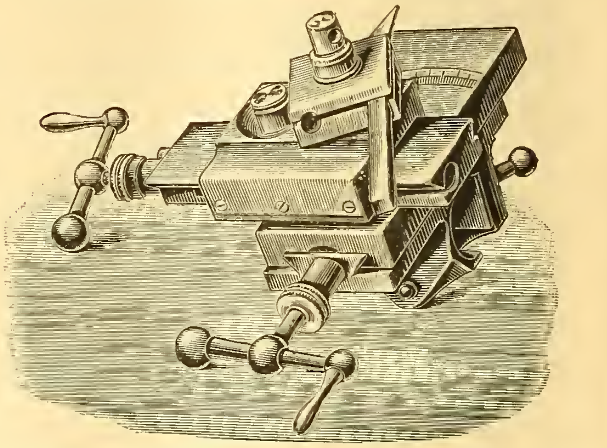


The bar, which is eight inches long, is round, with one side flatted and grooved to take smoothly and accurately the sliding fixtures, which are fitted with a hardened steel plate corresponding to the flatted side of the bar. The runners slide in cut bearings, and the slightest movement of the lever screw is sufficient to bind them. The standards incline towards the workman, which is an obvious advantage.



The illustration showing the various runners will speak for itself; but there is one, the "Universal" runner, which calls for special remark by its ingenious adaptations. It serves the purpose of centreing and drilling pivots in the most simple and perfect manner; for drilling small holes and for polishing pivots on notches, like a Jacot tool; these operations being carried out by separate pieces which fit the runner, and, being centred to the exact position by a smaller runner passing through the other, the work is rendered most accurate and is rapidly executed. One other (shown holding a drill) is also very ingenious; the front part is hollow, nicely tapered, and fitted to it are twelve small pieces, forming a full assortment of various shaped centres for turning, thus obviating the necessity of a similar assortment of full size runners. As indicated, this runner is also a drill holder for general use, and the stocks supplied to hold the drills are made to take the three sizes of the well-known finished drills now so generally used.

The sliding headstock is of one piece, with pulley running freely behind it; its height to centre is one-and-a-half inches. The arbor is drilled throughout, hardened and exactly adjusted, and the bearings, which are remarkably easy and smooth running, are capable of adjustment at any time to give play or take up for wear. The mouth of the arbor is shaped to receive the American split and other chucks, which are tightened by a spindle from behind. The split chucks are hardened at the heads, and the spindle being hollow, wire of any length can be introduced.



The slide rest is, for its size, most solid and steady, and there is nothing of which the lathe is capable that this rest will not turn with the greatest possible accuracy. It is arranged to turn longitudinally as well as transversely, and is adjustable for height of cutter or angle of slope. There is also supplied an admirable mandrel plate with centre and dogs, which, though somewhat small, is yet capable of taking any ordinary watch work, and is found most useful. These appliances, with others of useful purport, are all of the very best workmanship and finish. The principal parts are nickel-plated, and the whole, fitted into a walnutwood case, forms one of the most compact and useful watchmaker's companions that could be desired.

This lathe is introduced to the English market by Messrs. R. Haswell & Sons, of Spencer Street, Clerkenwell.

Notices to Mariners.

THE following notices have been issued by the Hydrographic Department of the Admiralty, which may be of interest to chronometer makers :—

FRANCE.—Standard Times at which Time Signals are made, with particulars.

The following particulars concerning the time signals on the coasts of France have been published by the French Government :—

The time signals at the undermentioned places are uniformly made at 10h. 0m. 0s. a.m. Paris mean time—equivalent to 9h. 50m. 39s. a.m. Greenwich mean time—and repeated at 10h. 2m. 0s. a.m. Paris mean time—equivalent to 9h. 52m. 39s. a.m. Greenwich mean time.

Cherbourg.—The signal is a metal disc about 3 feet in diameter, situated on the look-out of Fort l'Onglet, Quai Napoleon, at an elevation of 35 feet above the sea. The disc is placed in a vertical position five minutes before signal, and is dropped to a horizontal position, by electricity from the Naval Observatory.

Position of time signal, lat. 49° 38′ 42″ N., long. 1° 37′ 34″ W.

Note.—Weather signals are made from the look-outs on the breakwater and at Ile Pelée at the entrance to Port de Cherbourg.

Brest.—The signal is a flag hoisted five minutes before time, as preparatory.

Position of time signal, lat. 48° 22′ 46″ N., long. 4° 29′ 48″ W.

L'Orient.—The signal is a ball, 4 feet in diameter and painted black (drop 51½ feet), placed on a mast at the Harbour tower, at an elevation of 130 feet above the sea. The ball is hoisted five minutes before signal, as preparatory.

Position of time signal, lat. 47° 44′ 45″ N., long. 3° 21′ 15″ W.

Fouras.—The signal is a balloon (drop 44½ feet) placed on a tower at an elevation of 160 feet above the sea. The balloon is hoisted five minutes before signal, and dropped by electricity from the Naval Observatory.

Position of time signal, lat. 45° 59′ 10″ N., long. 1° 5′ 50″ W.

Rochefort.—The signal is a balloon (drop 36 feet) situated on the tower of St. Louis at an elevation of 143 feet above the sea. The balloon is hoisted five minutes before signal, and dropped by electricity from the Naval Observatory.

Position of time signal, lat. 45° 56′ 10″ N., long. 0° 57′ 35″ W.

Toulon.—The signal is a ball, 2 feet in diameter and painted black (drop 6½ feet), situated at the Naval Observatory, at an elevation of 120 feet above the sea.

The ball is hoisted ten minutes before signal, and dropped by hand.

Note.—A red-and-white triangular flag is hoisted at this station on the 10th, 20th, 30th or 31st days of each month, when observations have been made the previous evening. If hoisted during these intervals of ten days, it signifies that the apparatus for dropping the ball is being adjusted.

By command of their Lordships,
W. J. L. WHARTON,
Hydrographer.
Hydrographic Office, Admiralty, London,
January 29, 1887.

This Notice affects the following Admiralty Charts :—Port de Cherbonrg, No. 2602 ; Brest Roadstead, No. 2690 ; Port Louis and l'Orient, No. 304 ; France, West Coast, No. 2746 ; Toulon Harbour, No. 151. Also, Admiralty List of Time Signals, 1880, pages 24, 25 ; Channel Pilot, part ii., 1882, page 19 ; Sailing Directions for the West Coasts of France, Spain and Portugal, 1885, pages 26, 46, 76, 77 ; and Mediterranean Pilot, vol. ii., 1885, page 56.

UNITED STATES.—Standard Times at which Time Signals are made.

With reference to Notice to Mariners, No. 111, of June 13, 1885, on the establishment of Time Signals at Philadelphia, at Baltimore, and at Hampton Roads, the following further information has been received from the United States Government :—

All time balls on the Atlantic and Gulf of Mexico Coasts of the United States are dropped at noon mean time of the 75th meridian—equivalent to 5h. 0m. 0s. p.m. Greenwich mean time. As the time at New Orleans is that of the 90th meridian, the ball at that place is dropped at 11h. 0m. 0s. a.m.—also equivalent to 5h. 0m. 0s. Greenwich mean time.

The balls on the Atlantic and Gulf of Mexico Coasts are dropped by electricity from the Observatory at Washington, with the exception of that at Boston, which is dropped by electricity from Harvard University.

By command of their Lordships,
W. J. L. WHARTON,
Hydrographer.
Hydrographic Office, Admiralty, London,
January 12, 1887.

This Notice affects the following Admiralty Charts :—Boston Harbour, No. 2871 ; Long Island Sound, western part, No. 2755 ; New York, No. 2491 ; Savannah River to St. Helena Sound, No. 2680 (time ball at Custom House, Savannah). Also, Sailing Directions for the principal ports of the United States, pages 49, 129, 198 ; West India Pilot, vol. i., 1883, page 447 ; and List of Time Signals, 1881, page 28.

Commercial Failures.

ACCORDING to *Kemp's Mercantile Gazette*, the number of Failures in England and Wales gazetted during the four weeks ending Saturday, January 29, was 356. The number in the corresponding four weeks of last year was 324, showing an increase of 32.

The failures were distributed among the following trades : and, for comparison, we give the number in each, in the corresponding weeks in 1885 and 1886 :—

	1887	*1886*	*1885*
Building Trades	39	33	46
Chemists and Druggists	6	1	3
Coal and Mining Trades	9	8	6
Corn, Cattle and Seed Trades	8	10	7
Drapery, Silk and Woollen Trades	29	38	39
Earthenware Trades	2	3	4
Farmers	31	28	6
Furniture and Upholstery Trades	4	3	9
Grocery and Provision Trades	63	46	50
Hardware and Metal Trades	9	11	12
Iron and Steel Trades	8	8	12
Jewellery and Fancy Trades	17	9	9
Leather and Coach Trades	9	17	15
Merchants, Brokers and Agents	17	16	16
Printing and Stationery Trades	10	4	9
Wine, Spirit and Beer Trades	30	34	24
Miscellaneous	65	55	45
Totals for England and Wales	356	324	312
Scotland	92	89	85
Ireland	18	21	18
Totals for United Kingdom	466	434	415

The number of Bills of Sale published in England and Wales for the four weeks ending Saturday, January 29, was 942. The number in the corresponding four weeks of last year was 921, showing an increase of 21.

The number published in Ireland for the same four weeks was 65. The number in the corresponding four weeks of last year was 83, showing a decrease of 18.

APPLICATIONS FOR LETTERS PATENT.

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham ; and 6, Lord Street, Liverpool.

1,084. H. Swan, Stoke Newington, for "Improvements in studs, solitaires and such like articles." Dated January 24, 1887.

1,514. R. E. Middleton, London, for "Improvements in synchronous timekeepers." Dated January 31, 1887.

1,587. E. Brockhuysen, London, for "Improvements in the setting of diamonds and other precious stones, and the like." Dated February 1, 1887.

1,591. E. E. Wigzell, London, for "Improvements in clocks." Dated February 1, 1887.

1,609. W. J. Barnsdale, London, for "Improvements in and connected with electrically-wound clocks." Dated February 1, 1887.

1,905. A. Woolfert and O. Hetterich, London, for "A new handle for jewellery, despatch and fancy boxes, bags, furniture, opera glass cases and other articles." Dated February 7, 1887.

2,124. H. L. Symonds, London, for "Attachments or means for suspending pencil cases and other like articles to watch chains or guards, and for readily detaching the same therefrom." Dated February 10, 1887.

2,178. P. Pommier, London, for "Improvements in watches." Dated February 11, 1887.

2,258. R. D. Sanders, London, for "Improvements in pendulums." Dated February 12, 1887.

2,309. A. Junghans, London, for "Improvements in keyless watches." Dated February 14, 1887.

2,424. C. Walker, London, for "The combination of a transparent glass clock or dial face with a moveable advertisement or other indicator screen at the back of same." Dated February 16, 1887.

2,497. A. M. Clark, a communication from H. D. Martin-Pouget, France, for "An improved safety attachment for watches." Dated February 17, 1887.

2,566. B. Baden-Powell, London, for "Improvement in studs and fasteners." Dated February 18, 1887.

2,602. C. A. Burghardt and W. J. Twining, Manchester, for "Improvements in the production of aluminum and of alloys of aluminum and copper by electro-deposition." Dated February 19, 1887.

Some recent American Patents.

A watch regulator has been patented by Mr. Jules C. Levasseur, of Milianah, Algeria. This invention provides means for adjusting the balance regulator of a watch without opening the case, and consists of a segmental gear wheel attached to or formed upon the regulator and mechanism in gear therewith, whereby the regulator may be adjusted by means of the winding stem, when arranged for setting the hands, or by an independent stem fitted in the case, with other novel features.

An article of jewellery has been patented by Mr. Jethro C. Cottle, of New York city. This invention covers an improvement in ornamental pins for neck scarves, handkerchiefs, &c., embodied in the form of an insect or bird made of gold, silver or other suitable metal, the feet or claws serving to attach the pin, which is acted on by a concealed spring, the wings serving as levers to overcome the tension of the spring, to separate the claws, to detach the article from clothing.

Among some recent applications are the following :—

353,706, 353,961. D. O'Hara, for "A watch case."
353,933. W. H. Fitz Gerald, for "A watch case centre."
353,930. W. H. Fitz Gerald, for "The manufacture of watch case centres."
353,932. W. H. Fitz Gerald, for "The manufacture of watch cases."
353,929, 353,931. W. H. Fitz Gerald, for "The manufacture of crowns for watch cases."
353,687. A. L. Keller, for "A stem-winding watch."
354,002. C. V. Woerd, for "A stem-winding watch."
353,795. H. A. Lugrin, for "A stop watch."
353,749. A. L. Keller, for "A pendant stem for watches."

Meetings of Societies, &c., for the Month.

Societies.	March.
Inventors' Institute, Lonsdale Chambers, Chancery Lane	7, 21
Photographic, 5*a*, Pall Mall East	8
Society of Arts, John Street, Adelphi	2, 9, 16, 23, 30
Geological, Burlington House	9, 23
Numismatic, 22, Albemarle Street	17
Mathematical, 22, Albemarle Street	10
Royal Astronomical, Burlington House	11
Royal Meteorological, 30, Great George Street ...	16
Geologists' Association, University College	4
Royal Microscopical, King's College	9
Quekett Microscopical Club, University College ...	11, 25
British Archæological Association, 32, Sackville Street	2, 16
Royal Archæological Institute, Oxford Mansion, Oxford Street, W.	3
Royal, Burlington House	3, 10, 17, 24, 31
Antiquaries, Burlington House	3, 10, 17, 24
Physical, Science Schools, South Kensington	12, 26

Gazette.

Partnerships Dissolved.

Joseph Rodgers, Son & Lindley, Ecclesfield, steel manufacturers. Fowler & Walter, Newgate Street, wholesale jewellers. Kirwan & Bolding, Birmingham, jewellers. R. J. & D. Garland, Upper Kennington Lane, Vauxhall, pawnbrokers. Levin & Co., Liverpool, jewellers, &c. Powell & Powell, Liverpool, pawnbrokers. Hetherington & Davis, Birmingham, manufacturing jewellers. I. Ahronsberg & J. Ahronsberg (trading as J. Ahronsberg), Birmingham, ring manufacturers.

THE BANKRUPTCY ACT, 1883.

Receiving Orders.

To surrender in London.—Moses Rosenberg (trading as Oswald Rosenberg), St. Paul's Road, Canonbury, wholesale jeweller. Alfred Clarence Alais, Beauclerc Road, Hammersmith, engraver. Charles l'Huillier & Jules Dubois, Hatton Garden, watch manufacturers.

To surrender in the Country.—Hermann Widmann, Bristol, watch manufacturer. John Martin Dickinson, Sheffield, engraver. George Frederick Fletcher, Sheffield, engraver. William Banks, Bolton, optician. Thomas Harrison, South Stockton, pawnbroker. William Henry Winstone, Cardiff, jeweller.

Public Examinations.

In London.—W. E. Carter, Cheapside and Regent Street, jeweller ; March 9, at 11.30. J. Hart & E. Saber (trading as Hart, Saber & Co.), Old Broad Street and Kimberley, South Africa, South African merchants ; March 4, at 12.

In the Country.—A. H. Toy, Birmingham, brassfounder ; March 1, at 2. J. M. Dickinson, Sheffield, engraver ; March 3, at 11.30. W. Banks, Bolton, optician. G. F. Fletcher, Sheffield, engraver ; March 10, at 11.30.

Adjudications.

In London.—A. C. Alais, Beauclerc Road, Hammersmith, engraver.

In the Country.—H. Widmann, Bristol, watch and clock maker. A. Wilcox, Birmingham, manufacturing jeweller. J. M. Dickinson, Sheffield, engraver. G. Fletcher, Sheffield, engraver. W. Banks, Bolton, optician.

Notices of Dividends.

In the Country.—G. Hogg, Powis Street, Woolwich, watchmaker ; 14s. 4d., first and final ; on and after February 11, Trustee, 36, Hatton Garden, E.C. H. King, King's Lynn, Norfolk, watchmaker ; 1s. 11d., first and final ; any day, Official Receiver, King Street, Norwich.

Correspondence.

All Letters for Publication to be addressed to the Editor *of* The Watchmaker, Jeweller and Silversmith, *Imperial Buildings, Ludgate Circus, E.C.*

All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.

To the Editor of *The Watchmaker, Jeweller and Silversmith.*

Dear Sir,—A short time ago I was making a small steel disc for a milling cutter, about half-an-inch diameter and one-eighth thick. Having cut a square off a flat piece of steel and turned it true, I hardened and tempered it, and then found it oval. My master tells me it is always so, and to get it round I must cut a slice off a round rod and then it will harden true ; but he cannot tell me why. Now if you or some of your able correspondents could give the reason, I think it would be useful to others as well as "A Young Apprentice."

Buyers' Guide.

The Sheffield Smelting Company, Sheffield, *Sell* Gold and Silver (pure and alloyed). *Buy* all materials containing Gold and Silver.

F. W. Powell (now **Fowler & Powell**), Colonial Buildings, Hatton Garden, E.C. Wholesale only for Gold and Silver Jewellery ; Silver Cigar, Cigarette and Card Cases, Match Boxes, Salt Cellars ; Silver and Glass Smelling Bottles ; Sovereign Purses.

Jones, E. A., Wholesale Manufacturer of Whitby Jet Ornaments. A Large Assortment of the Newest Patterns always in Stock. Export Orders promptly executed. Persons not having an account open will avoid delay by forwarding a reference with their order. Customers' Matchings and Repairs with despatch. 93, Hatton Garden, London, E.C.

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The
Watchmaker, Jeweller and Silversmith.

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CAUTION.

Our readers are cautioned against paying money to A. MAYNARD, who no longer represents this Journal.

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The Watchmaker, Jeweller and Silversmith.

A Monthly Journal devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

Subscription.—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

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Editorial.

AN important amendment of the law affecting Design Patents, which will do much to restore confidence in and remove a widely prevailing impression among inventors on this side of the Atlantic with regard to the inadequate security afforded by the American Patent Law, has recently been passed by both Houses of the United States Legislature and received the President's approval.

It was held, under the old law, that in case of a patentee complaining of an infringement of his design, complainant must prove to the satisfaction of the Court what portion of his loss, or what portion of the profit made by the infringer was owing to the use of the design patented. As this was, in the great majority of cases, manifestly impossible, and invariably so in the case of the patentee being at too great a distance to personally look after his interests, any unprincipled person could drive the proverbial coach and horses through the registration with impunity, rendering it practically useless.

The object of the amendment, of which the following is the text, and which is entitled "An Act to amend the Law relating to Patents, Trade Marks and Copyright," is to obviate this limitation and to enable a patentee to recover damages in cases of infringement :—

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That hereafter, during the term of letters patent for a design, it shall be unlawful for any person other than the owner of the said letters patent, without the licence of such owner, to apply the design secured by such letters patent, or any colourable imitation thereof, to any article of manufacture for the purpose of sale, or to sell or expose for sale any article of manufacture to which such design or colourable imitation shall, without the licence of the owner, have been applied, knowing that the same has been so applied. Any person violating the provisions, or either of them, of this section shall be liable in the amount of two hundred and fifty dollars; and in case the total profit made by him from the manufacture or sale, as aforesaid, of the article or articles to which the design, or colourable imitation thereof, has been applied, exceeds the sum of two hundred and fifty dollars, he shall be further liable for the excess of such profit over and above the sum of two hundred and fifty dollars; and the full amount of such liability may be recovered by the owner of the letters patent, to his own use, in any circuit court of the United States having jurisdiction of the parties, either by action at law or upon a bill in equity for an injunction to restrain such infringement.

Sec. 2. That nothing in this Act contained shall prevent, lessen, impeach, or avoid any remedy at law or in equity which any owner of letters patent for a design, aggrieved by the infringement of the same, might have had if this Act had not been passed; but such owner shall not twice recover the profit made from the infringement.

The difficulty of obtaining the recognition of inventors' rights by foreign patent offices—a difficulty which has been greatly aggravated in the past by the insecurity or uncertainty of the protection when granted—has done much to restrain reciprocal enterprise in this direction, and any actions which tend to break down international prejudices must be mutually beneficial and should be hailed with general satisfaction.

Among the watchmaking fraternity and the rest of the trades concerned, the Merchandise Acts Amendment Bill, now before a Select Committee of the House of Commons, has for the time being excluded all other topics. In the words of a leading politician, it "holds the field."

As we have from time to time given our views on the Hall-marking question in connection with the fraudulent imitation of English watches, a brief consideration of those sections of the Bill which affect watchmakers will not be out of place.

Should the Bill in its present form become law, it would undoubtedly result in very drastic changes taking place in the watch manufacture of this country. Whether or not these changes would benefit the numerous branches interested is what we propose to discuss. The present Bill is not intended to affect either the common law relating to fraudulent misrepresentations nor the Trade Marks Act. As its title indicates, it is an amendment of the old Merchandise Marks Act of 1862, but in this respect (unlike the usual effect of codicils) it does not interfere with or nullify the original Act in any way, merely acting as a supplementary measure, and strengthening those clauses which relate to the prosecution of offenders under the original Act. The avowed object of its promoters and backers is the protection of manufacturers and the public against those kinds of fraudulent offences with which the old Act failed to deal; and the sections which apply to watches have been specially introduced in order to meet a particular difficulty with regard to unfair foreign competition brought about by the Hall-marking of foreign-made cases. The questions for the consideration of the watch trade are: Do the sections referred to satisfactorily meet this difficulty, and what effect would they have (if confirmed) upon the English watch trade?

To go over the whole of this well-trodden ground, to analyse severally each clause of these sections, would require more space than we have at our disposal, and it is not our purpose to more than summarily examine their salient features.

That the marks (as set forth in Section 9) placed upon watch cases by the assay offices of the United Kingdom have been frequently treated as indications of the British origin of the cases so marked, is undeniable, and, as we have on several occasions pointed out, an alteration of the law which permits of the stamping of foreign-made cases is desirable for the prevention of "fraud in connection with watches." This alteration is efficiently made in the first sub-section of Section 9. But what would be the effect of the sub-section which follows, which throws the responsibility of declaring what "works" a case is to contain on the case maker? He is not generally an expert; and if he were, it would be a very simple matter for a watchmaker to have a case made to one movement which he intended for another (as is frequently done now), and this, so far as is indicated by this part of the Bill, with perfect impunity. Then, the assay offices are asked to give a character, through the stamp in the case, to a watch they have never seen on the strength of the irresponsible declaration of a person who probably knows nothing about it; irresponsible, inasmuch as the case maker is clearly absolved by the words "to the best of his information and belief."

It would be interesting to know what is meant by the term "works;" whether it is intended to designate the whole of the movement, or a part, or parts, of it, and, if the latter, what proportion of the "works" would render a watch liable to be labelled as of foreign origin. The legal necessity for and the difficulty of satisfactorily defining the term "movement" or "works," was one of the causes of the failure of the late Sir Henry Jackson's proposed Bill; the difficulty is overcome in the present case by leaving out the definition altogether.

The remaining portions of the Bill, dealing with procedure, penalties and search warrants, are of such a ludicrously impracticable nature as to be hardly worthy of consideration, and the whole Bill as applied to watches is permeated with a retrograde spirit entirely opposed to the character of modern legislation. Nevertheless, it will be a great pity and a standing reproach to English watchmakers, if, after all the recent agitation, the Bill is allowed to be shelved through the mistaken zeal of the technical advisers of its promoters, and it is to be sincerely hoped that the collaboration of the committees now sitting will result in the production of a workable measure that will remove the anomalies of the Hall-marking question.

A good mould for brass can be made of any fine sand, with just sufficient clay and water mixed as will keep it together. Plaster of Paris moulds do not answer for brass.

A good way of preventing steel knives from rusting when not in use is to dip them in a strong solution of soda, afterwards wiping them dry. They should be then rolled in flannel and kept in a dry place.

Electro-plating with Platinum.—Platinum has not been much used in electro-plating, notwithstanding its hard, durable and protective properties. This is, perhaps, chiefly owing to the practical difficulty of obtaining a good firm "reguline" deposit. A process for effecting this has, however, been brought out recently by a Mr. Bright, whose patents have been acquired by the Bright Platinum Plating Co., and are in actual operation in London at works established there. Platinum has the advantage of keeping its colour where silver, brass or copper becomes discoloured, and will, to some extent at least, replace the use of these metals in electro-typing. It will be highly useful in plating chemists' crucibles and so on. German silver, for example, plated with platinum can be used to manipulate strong acids. By the Bright process, platinum can be deposited on any surface which can be electro-plated with other metals.—*Scientific American.*

General Notes.

The will of the late Sir Joseph Whitworth was proved last month, when it was announced that the personalty amounted to over £400,000.

The Merchandise Marks Act (1862) Amendment Bill and the Fraudulent Marks Bill were read a second time on the 14th ult., and referred to a Select Committee.

The Queen has intimated to the authorities at Liverpool, through Sir Henry Ponsonby, that she feels a deep interest in the forthcoming Exhibition in that city, and readily grants it her patronage.

Messrs. Ralph Heaton & Sons, of Birmingham, have recently turned out 9,000 large bronze medals for the Colonial and Indian Exhibition, in addition to a new North Borneo coinage, and are now engaged on a silver coinage of £80,000 in value for Nicaragua. The firm is doing a large and increasing trade in copper cylinders, produced by their special process for drawing down into tubes.

A jubilee medal has just been executed by Mr. John Pinches, of Oxenden Street, who has obtained Her Majesty's sanction to its publication. On the obverse is a portrait of the Queen in the centre, flanked by two figures representing Peace and Plenty supporting the Imperial Crown. On the reverse is a wreath of roses, shamrocks and thistles, enclosing the inscription :—"*In cordibus populi Imperium. Victoriæ Reginæ, Anno Jubilæo, A.D. MDCCCLXXXVII.*," under which is the motto, "*Dieu et mon droit.*" The work has been well executed, and the badge forms a very chaste and suitable souvenir of the Jubilee Year.

The Athens correspondent of the *Daily News* telegraphs that the Greek Archæological Society is continuing its extensive excavations at the Acropolis. Many objects of interest have been discovered, the most important being a bronze statuette, 13 inches high, representing Athena, which was found to the north of the Erectheum. It is believed to belong to the period prior to the Persian invasion of Greece.

The Prince and Princess of Wales have accepted the invitation of the Mayor and Corporation of Manchester to open the Jubilee Exhibition at that city in May next. Their Royal Highnesses will be entertained either at the Town Hall or at the Mayor's private residence ; and it is possible that their visit may be extended over two days.

Daring Robbery of Jewellery.—About one o'clock on the morning of the 22nd ult., Mr. Jackman, a jeweller, carrying on business in High Street, Fareham, near Portsmouth, heard a smashing of glass, and on looking out of his bedroom window saw a man take out an armful of the costliest stock, consisting of gold watches, rings, &c., from the shop window. Mr. Jackman hurled a music-stool at the burglar, hitting him on the back ; but this did not prevent him from making good his escape, together with a companion. The shutters were found to have been bored with a centre-bit in fifteen places, then taken down and the window smashed. The property lost is of the estimated value of £500.

Messrs. B. H. Joseph & Co. have sent us a new and revised illustrated catalogue of their Primrose League Badges and Ornaments, copies of which they will be glad to issue to the trade free on application. The demand for these goods increases in proportion to the increase in the ranks of the Primrose League, and we understand that Messrs. Joseph & Co. are the only wholesale makers from whom they can be obtained.

The business of Mr. W. A. Carlyle, of the Constitution Hill Dynamo Works, Birmingham, has been turned into a limited liability company under the title of the Carlyle-Elmore Co. (Limited). The new company, which was registered on February 2, has a capital of £10,000.

Mr. Samuel Mason, of Birmingham, who has prepared an extensive exhibit for the Adelaide Exhibition, has just introduced a new white metal, which is being very favourably received. It is said to be peculiarly well suited for bar fittings, &c., which are a specialty of this manufacturer.

The Priory Brass Co., Birmingham, have removed from Coventry Street to Victoria Works, Aston.

Liverpool Imperial Jubilee Exhibition.—The arrangements for this Exhibition are being rapidly pushed forward, under the direction of a number of departmental committees. It is intended to have six great courts or sections, in which the victories of peace and war during the Queen's reign will be typically illustrated. One section will be devoted to showing the progress made by India and the Colonies ; another to trophies and relics of the wars of the reign ; a third to the results of explorations and their bearing upon the countries in which they have been conducted ; a fourth to life-saving appliances by sea and land ; a fifth to machinery, mechanical engineering and agricultural implements ; and a sixth to illustrations of the trades, manufactures and industries of Liverpool. Amongst other attractions, it is intended to erect an old Lancashire village, in which two of the old style market-places will be established, and there will also be high-class musical performances, electric light illuminations, and fruit and flower shows.

The annual value of the mineral products of the United States is about £85,000,000, and some £160,000,000 are invested in the mining industry. Mining furnishes employment to 500,000 men. In Montana, the newest mining country, 50,000 people are dependent on silver and gold mining.

New Diamond Diggings at the Cape.—The Agent General for Cape Colony is officially informed that diamonds having been found to exist in payable quantities at a spot known as "Welsh's Prospect," in the Barkly-West division of the colony, it has been proclaimed by the Governor to be "Alluvial Diggings" within the meaning of the Colonial Act of Parliament for the management of mines of precious stones and minerals.

The Diamond Market.—Continental reports show a decidedly unsatisfactory state of the market from a buyer's point of view. In *Amsterdam* there have been hardly any purchases made during the month in consequence of the high prices demanded for rough stones, in reference to which *De Diamant* observes that it certainly seems somewhat enigmatic that "London" keeps up an imaginary scale of prices in face of the fact that, if Amsterdam and Antwerp do not purchase, a large quantity of *rough* remains unsold. The *Paris* market continues flat for both rough and finished stones, but prospects with regard to the latter are improving in consequence of several well-known American buyers being expected. In *London* the market is well provided with parcels of all kinds, and, although the sales effected have been inconsiderable, prices are well maintained. Five steamers of the Castle line arrived since our last report, bringing fair quantities of the usual current articles ; plenty of "cleavers" and "spotted" coming to hand. Cablegrams from the *Cape* state that there has been a good demand for all classes of goods, but that the market is now somewhat weaker and prices show a tendency to decline.

Silver.—The market has been unusually flat throughout the month and little or no business has been done. Quotations have steadily declined and now remain nominally 44¾d. and 43½d. for bars and Mexican dollars respectively.

Birmingham News.

From Our Correspondent.

FAIN would I make a glowing picture of the revival in the jewellery trade: it would be a matter of the greatest satisfaction to paint in brilliant colours the general stir and consequent rejoicing: to report how full the manufacturers' order books still continue to be, and the high prices that goods are quoted at in all classes. But, alas! to be of service to the trade, I must stick to the truth, however black and distasteful it may be, and I can only report the reverse of all this. To say that trade here is about as bad as it is possible to be would not be going very far past the mark, and there is no doubt that manufacturers, in many instances, are working from "hand to mouth." The bustle consequent upon the Jubilee work is pretty much completed, and repeat orders do not seem to be forthcoming. I can hear of several makers sending parcels of Jubilee goods out on approbation, a sure sign that sales are getting scarce. Shopkeepers report that the public have not yet taken up the matter, and their stocks still remain in the windows; this will, no doubt, be altered directly, as it is somewhat early in the year, but makers have pulled up short in consequence, and are now in search of other novelties.

* * *

I hear, from the very best source, that at the next meeting of the directors of a company of jewellers here (Messrs. G. E. Walton & Co., Limited), that a proposition will be brought forward to the effect "that in future, in all cases of customers being unable to meet their engagements, and calling their creditors together with a view to getting them to accept less than twenty shillings in the £, that they (Messrs. Walton & Co.) will strictly, and without exception, oppose such propositions, and will accept nothing but payment in full or bankruptcy." They are quite firm and determined in this matter, and I feel sure that their example will be followed, as it will, no doubt, prove a very wise and paying course. It is obvious that intending defaulters, of which the jewellery trade sees not a few, will steer clear of Messrs. Walton & Co., as they will know that half-a-crown in the £ will not pull them through there, and an investigation of their affairs, such as the Official Receiver would find necessary, might have some unpleasant results. I am very pleased that someone has at last had the courage to take this step, and I heartily congratulate the promoters of it: and if other firms will only follow the example, they will find that their "bad debts" will be very much less numerous in the future.

* * *

I can hear of a few instances among the coloured gold workers of a revival of filigree work; not the imitation of Indian filigree, which is open or woven work, but wire laid upon a surface, similar to the Italian or Castalinian work. I have seen a few very good samples recently, by the permission of the makers, and wish them every success, as it will find employment for good and artistic workmen, and gives plenty of scope for design.

* * *

By the kind permission of Messrs. Elkington & Co., I am able to give an account of the trowel and mallet presented to Her Majesty, and used by her in laying the foundation stone of the new Victoria Law Courts, on Wednesday, March 23, 1887. A full description and drawing of the same will be found on another page.

* * *

Birmingham has a very old reputation for buttons, medals and such like articles; and she certainly does not intend to lose it in her prime of life for medal making, for the variety of styles that are being produced this year is really astonishing, and the quite substantial looking articles that are being retailed at one penny are marvellous compared with former times. The old fashioned pewter has had to "take a back seat," and make room for its more pretentious neighbours in the form of stars and a thousand other devices; and as they are all "gilt and plated up to the knocker," as the Birmingham workman expresses it, they look quite a superior article. These marvels of cheapness, bearing very fair portraits of the Queen in low relief, are all produced in the die, and the die sinkers and stampers have been working early and late for some months past in order to be ready for the laying of the stone on the 23rd, when Birmingham came out in her Sunday clothes to welcome Royalty, and made a very fair show by means of a large display of flags, bunting and gas illumination, aided by coloured glass, and succeeded in several instances in producing quite noteworthy effects; which vast numbers of her worthy citizens and visitors from other towns did their very best to smash each other in their endeavours to get the best view of.

A Civic Mace.

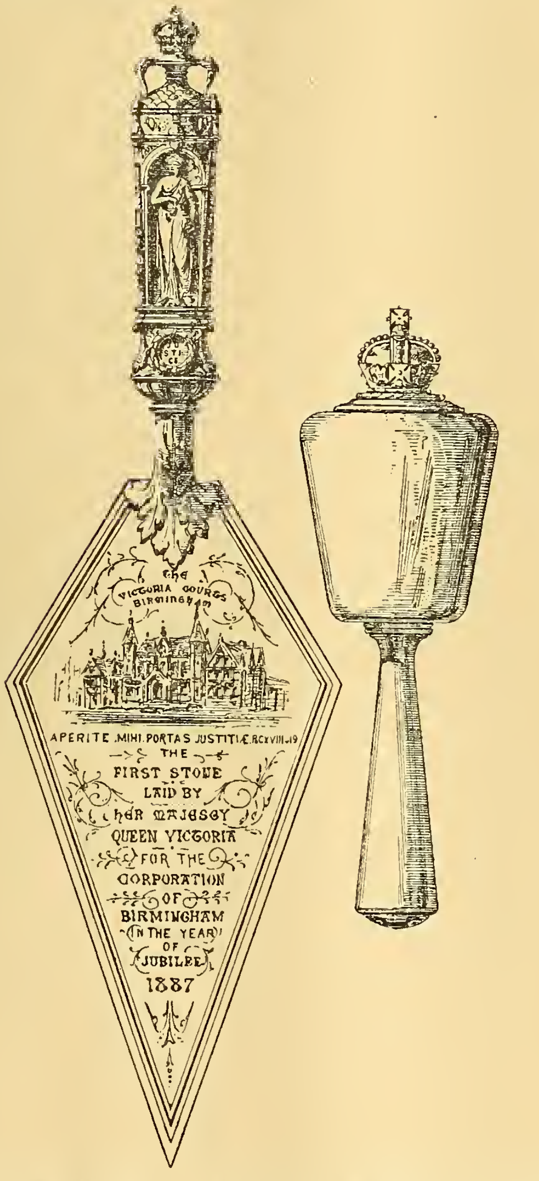
MR. GEORGE HOLDSWORTH, on the completion of his year of office as Mayor of Kidderminster, in November last, expressed a desire to present to that borough a silver-gilt mace, as a permanent record of the Jubilee Year. After the cordial acceptance of the offer by the Town Council, the commission was entrusted to Messrs. T. & J. Bragg, of Birmingham, who have now produced a piece that will rank among their happiest efforts. The style has been based upon that of the ancient loving cup in the possession of the Corporation, while the addition of a rich and varied series of enamels gives to it a richness and beauty of effect which is peculiarly its own. The head, which has the massive force of many mediæval maces, has beneath it a fillet of Maltese crosses and *fleurs-de-lis*, carefully modelled from the best examples, and has in a band beneath, in raised letters, the legend—"Jubilee Year of Her Most Gracious Majesty Queen Victoria, 1887." The vase portion has in enamel a raised shield—the arms of Kidderminster—with flying riband and enamelled motto; while on the reverse are the arms of the Sovereign, the intervening spaces being occupied with arabesques of shells, dolphins, in repoussé, after the style of the loving cup before referred to. The knops are decorated in a similar style, with the addition of oak wreaths, bands of enamel occurring at intervals, the inscription being enamelled in a large minitor near the base, together with the crest and motto of the donor. The whole is carried out in solid silver, Hall-marked and richly gilt, in suitable case, and will be a fitting companion to the Mayoral chain executed by Messrs. Bragg some years since for the same Corporation.

The official returns of the United States for 1886, recently published, show a considerable increase in the foreign "jewellery" trade over that of the previous year. The value of imports of clocks and parts thereof for the year 1886 was 376,279 dols., against 288,044 dols. for 1885. This is an increase of some 90,000 dols. Of watches, watch materials and movements, the value of the imports was 1,295,357 dols., against 902,913 dols. for 1885, which is an increase of nearly 400,000 dols. The value of the imports of jewellery and manufactures of gold and silver during 1886 was 897,078 dols., against 1,286,594 dols. in 1885. The value of precious stones and imitations of, not set, was 9,306,074 dols., against 6,326,881 dols. during 1885. This shows for 1886 the great increase of 3,000,000 dols. The value of rough or uncut diamonds, including glaziers, imported during 1886 was 300,226 dols., against 318,716 dols. the year preceding. The value of the clocks and parts thereof exported during 1886 was 1,099,440 dols., against 1,136,950 dols. for 1885. The value of the exports of clocks is about three times as great as that of the imports. The watches and parts thereof exported during 1886 amounted in value to 346,488 dols., against 174,835 dols. Compared with the imports, says the *St. Louis Jeweler*, "it will be seen that Europe sends to this country largely in excess of what we send abroad. The American factories have not yet conquered the whole of this country's watch trade." In the exports of jewellery of domestic manufacture the showing is somewhat better, the figures being 428,326 dols. in 1886 and 391,498 dols. in 1885.

Laying of the Foundation Stone of the New Victoria Law Courts, Birmingham.

PRESENTATION TROWEL AND MALLET.

We give herewith an illustration of the trowel and mallet used by Her Majesty on the occasion of the laying of the foundation stone of the new Victoria Law Courts, Corporation Street, Birmingham, on March 23, 1887. They are the generous gift of Messrs. Elkington & Co., Newhall Street, Birmingham, and have been made by them expressly for the occasion, from designs prepared specially by the Architects of the Courts, Messrs. Aston Webb and E. Ingress Bell. The style is French Renaissance.


THE VICTORIA COURTS BIRMINGHAM
APERITE MIHI PORTAS JUSTITIÆ RCXVIII.19
THE FIRST STONE LAID BY HER MAJESTY QUEEN VICTORIA FOR THE CORPORATION OF BIRMINGHAM IN THE YEAR OF JUBILEE 1887

The Trowel, which is of solid silver, is partly in real repoussé and partly chased work; the handle is built upon a triangular plan, and consists of three niches, divided by ornamental pillars, and containing the figures of Law, Justice and Mercy, in bold relief. Below these are small circular medallions enclosed in a wreath of laurel, on which is inscribed the name of the figure above; the whole is gracefully surmounted by the Royal crown. The blade is embellished with a view in perspective of the new courts, and the following inscription:—

"'Aperite mihi Portas Justitiæ.'—Ps. cxviii. v. 19."

"The First Stone laid by Her Majesty Queen Victoria, for the Corporation of Birmingham, in the Year of Jubilee, 1887."

The Mallet is of ivory, silver mounted. The end of the handle is capped with silver, bearing the letters V.R., and the head is surmounted by the Royal crown. The whole is enclosed in a suitable case of blue velvet, and is a work of art worthy of the occasion, and greatly adds to the credit of both designers and silversmiths, who have spared no pains in order to maintain the art reputation of Birmingham.

The Hall-marking Question.

MERCHANDISE MARKS ACT, 1887.

The following letter has been addressed by Mr. A. Bedford, Manager of the American Waltham Watch Co., in Europe and Colonies, to the Secretary of the London Chamber of Commerce:—

I have before me a copy of Baron de Worms' Bill, entitled "Merchandise Marks Act Amendment," and yours of 22nd inst. (Feb.), inviting me to forward you any "views you may hold for the guidance of the Council on this question." Referring to Clause 8, Section 2: Suppose a foreign manufacturer of silver or gold cases sends 500 cases to be Hall-marked, he has to declare "to the best of his information" the place of manufacture of the "works" intended to be put in such cases, but these cases may be sold to different dealers, who fit in movements whose origin is various. Watchmaking within the past few years has become, as it were, a new industry—factories established wherein the work is done almost entirely by machinery, so that it is not an uncommon thing for a movement made in France or Switzerland to be identical in gauge with a movement made in England or America; thus, the aforesaid case maker could not make such a declaration demanded by the Act—the purchaser of his watch cases might employ them to fit movements made in any country. Where machinery is largely employed, and the gauges common to all large factories used, it is a well-known fact that large numbers of movements are made in Switzerland and France and imported into the United States, which fit perfectly to the cases made at our factory (for our own movements) at Waltham. The object of this Bill being to prevent fraud and protect both honest manufacturers and the public, we suggest that Section 1, Clause 9, which is a protection to the British case maker, be retained; that Section 2, Clause 9, be struck out, and in lieu thereof inserted a clause which shall protect the British watch *movement* maker equally with the watch *case* maker—to wit, enacting that all movements, or, as the Bill terms, "works," imported into the United Kingdom shall be liable to seizure and confiscation unless they bear upon them, conspicuously stamped or engraved on bridge or plate of movement (or works), the name of the manufacturer and the place of origin.

According to a contemporary, the work of the Royal Commission of the Adelaide Jubilee Exhibition may now be said to be at an end. During the five months previous to the appointment of the Commission, 207 exhibitors applied to the London Committee of the Adelaide Royal Commission for 30,791 feet of space in the Industrial Department; but during the five succeeding months these numbers have been increased by 677 exhibitors and 66,561 feet of space, which more than covers the whole ground originally allotted to the Northern Hemisphere, additional buildings having been required for the machinery department. The half of the Exhibition buildings which have been retained for the Colonies and countries in the Southern Hemisphere will also be amply filled, New South Wales and Victoria alone having transferred to Adelaide the contents of their courts which attracted so much attention at the recent Colonial and Indian Exhibition, besides voting considerable sums to assist their exhibitors to do honour to the chief celebration of the Jubilee Year in Australia. The Exhibition opens on June 20.

Watch Jobbing.

By X. O. N.

(Continued from page 183.)

THE best way of restoring a broken or distorted spring is to replace it by a new one; but, if a new spring of the exact strength is not easily obtained, a spring may be weakened a little by rubbing it on a bell-metal block charged with coarse red-stuff mixed very thin. A very fine cork, a little larger than the spring, may be used; but, if this cork is not of equal hardness, or not perfectly flat, some of the coils will be more weakened than others. To those who are accustomed to it, there is nothing like the middle finger for rubbing the spring on the block or polishing the sides of a spring. If the finger is used, both sides of the spring should be rubbed, and the spring blued again: but this can only be done with a hard spring. If the spring is soft, it can be stuck to a block by making the block hot and applying a little resin, then pressing the spring flat against the block: the resin will hold the spring on the block, and the coils will not get out of shape. The resin can be removed either in spirits of wine or by heating the spring a little in oil, and, if the under side of the spring is rubbed, there will be no necessity for blueing it again. A block for this or any similar purpose should have a hole in the centre (it may be round or square), with races turned on the face of it as a guide for keeping the spring in the centre, that the pressure on the article polished may be equal.

As to the application of Breguet springs to common watches, or even to watches that may not be described as common, they are certainly worse than flat springs, even if they were not shams, which most of them are, as it is much easier to get an ordinary watch to time in positions with a flat spring than with a spring that has an overcoil. In the first place these springs are always a great deal to large: the overcoil is turned up anywhere, without reference to where it is to be pinned in. They are generally soft, and, if the overcoil is bent, as it so often is, the difficulty of straightening it is so great, that it is no wonder watch jobbers cry out against such watches. The Swiss make their overcoils by bending the spring up at a sharp angle and then bending it down again at the height above the spring which they require: therefore, it is impossible to do anything with this part of the spring but break it off. As most, I may say all, of such watches have balances with screws, a couple of screws added to the balance will compensate for the loss of the half-turn of the spring, and turning up a new overcoil is not so formidable a job as it appears to some. If a piece of brass wire is driven into a small wooden handle, and the end of the wire has a hole drilled in it, and is filed up to something of the form of the spring stud of a full-plate watch; if the end of the spring is brought through the hole in this little spring-holder, say two-thirds of a turn, and made fast there with a pin that has a flat side, the end of the spring can then be lifted gradually the required height over the body of the spring, and the overcoil can be bent in with the tweezers while the spring is held in the left hand by the spring-holder, without any fear of bending or disturbing the coils, even if the spring is a very soft one. A workman often finds difficulty in bending this overcoil in consequence of the shape of his tweezers, the points of which are usually tapered, and consequently, as the end is bent inwards, it keeps bending downwards. This must be watched, and the overcoil should be the right height from the spring, and the curve the proper diameter before the spring is unpinned from the holder. Although this looks formidable, a little practice will make it simple and easy enough, and a workman will find it takes far less time than it will take him to cobble and try to restore the shape of a spring that has been a trial to someone already.

In an essay on the balance spring, written some years ago by Mr. Immisch, he gave a very apt illustration of the mischief arising from straining metals, by pointing out the difficulty of straightening a common brass pin that had been once bent; and pianoforte tuners are always very careful not to strain the wires more than is absolutely necessary to produce the tone or note required. Some chronometer makers have held that the irregularity in going, and the tendency to gain on their rates, known to exist in new chronometers, was entirely owing to the straining by bending the parts of the cylindrical spring that form the terminal curves of the spring. So that there is sufficient evidence that any manipulation of the balance spring of a watch should be done with great care, and that no sharp bends or angles be made in it that will require bending back again.

Another evil that watch jobbers complain of, as it also is a growing one, is the number of what are called compensation balances that are now to be met with in the commonest of watches. Formerly these sham compensation balances were not cut through, but occasionally a nick was cut on the upper side of the rim, for the sake of appearance, so these balances were no worse than the ordinary solid metal ones; but now the practice, having its origin in the same motive that induces manufacturers to apply Breguet springs to this class of watch, is to cut the balance through; and, as these balances are of the commonest make and the softest materials, it is difficult to handle them without bending them. If the balance be bent, it will be out of poise, and, of course, the time of the watch in different positions will be all out. But, even if the equipoise of balance was perfect, a balance out of circle would be an eyesore to even the wearer, and so the jobber must spend as much time over getting the balance true as it takes him to clean the watch. But supposing, as must be often the case, that the balance has been bent and trued by some not very skilful operator, the jobber's task of making it look nearly true has become infinitely greater, if not impossible, as the first operator has, no doubt, used either pliers or tweezers freely; and here the illustration of the bent pin becomes applicable and important.

Watch jobbers, and even watch manufacturers, have sometimes strange notions as to the division of labour, and the difficulty of doing certain things that appear difficult and mysterious, only because they have not taken the trouble to ascertain where the difficulty lies, nor why one man should be able to do a certain thing better than another man who is equally capable. And one of the things assigned to a certain trade is the cutting and trueing of compensation balances to balance makers. An examiner or jobber should be able (if he is worth his salt) to do this as well as any balance maker, as they have certainly far more opportunities of seeing balances in all forms of distortion, and more practice in correcting them than a balance maker can have. Yet it has been the practice of watch manufacturers to send their balances to the balance maker to be cut and trued; consequently, a good many people are under the impression that a balance maker has some mysterious tool, by which he spins the balance true after cutting, or other process, that he keeps a profound secret. There is nothing to prevent anyone doing this work as well as a balance maker but the want of courage to try and the patience to persevere. Cutting balances is not much in a jobber's way, and for doing the work properly special tools are required, which I will hereafter describe; but getting them true is his every-day work, and he should be able to do this efficiently and quickly. Although it is both the precept and practice of some people to take the screws out of the balances before commencing operations, I should never think of doing so, even to a new balance; it is a mere waste of time, as in these jobs that oftenest require the balance to be trued the balance rim is so soft and the screws so badly fitted that screwing them into the holes again would frequently make the balances as untrue as they were at first. The first requisite, then, is a pair of calipers, with good centres, that move moderately tight, and without guard or adjusting bar screwed on to them. As the cross-bar, or touch-piece, is better held by the finger and thumb of the left hand, this bar should be of thin sheet brass, and the point for touching the inside of the rim of the balance filed up small and square; this point can be brought to bear on the inside corner of the balance, free of the taps of the screws. If the rim is bent outwards, there is no other way so good as bending it in with the fingers; if the circle of the rim is complete, this bending will be sufficient, but if it is only complete in a small segment close to the arm, and is bent either outwards or inwards, after that, the rim of the balance should be held tightly in the finger and thumb of the left hand, at the part where it deviates from the circle, and the outer end of the lamina bent either out or in by holding a peg against the inside of the balance, in the right hand, pressing the thumb against the outside—always taking care not to bend too much. This process might be called the rule of thumb; but it is the best and simplest way of trueing a compensation balance, and in no circumstances should pliers or tweezers be used, except in a case where these tools have been freely used before, and where the bends are so sharp and numerous that the process described would be ineffectual, when bending with a pair of tweezers, made of hard wood or ivory, may be resorted to.

(To be continued.)

Preparing Articles for Electro-plating.

By Robert Marshall.

It is absolutely necessary that the article to be electro-plated should have a perfectly clean surface upon which to deposit the metal. By this it is meant that the surface must be purely metallic, all oxidation, grease, films, &c., being removed. There are few metals that do not contract a coating of oxide when exposed in this clean condition to the air, especially when the air is moist or the surface of the metal wet: hence the necessity of proceeding immediately with the plating operation after cleaning. Contact of the article with the warm hand is injurious, and, in consequence, articles to be plated should be handled as little as possible in the cleaning and subsequent operations. To ensure this the articles should be mounted on copper wires, by which they should be held. This latter point cannot be too firmly insisted upon, since many, if not all, the failures to obtain an *adherent* deposit arise from the surface not having been properly prepared, or from having been subsequently carelessly handled.

Rotating circular brushes are convenient for cleaning operations; they are usually mounted on a lathe, or in a specially-prepared machine of simple form, and provided with a small cistern or vessel to contain the liquid to be used, which drips on to the brush and the article. Hand-brushes are used when no rotating appliance can be had; they are usually of stiff bristles, of a nature best adapted to the work in hand. Scratch brushes for hand use are made of bundles of fine brass and other wires firmly bound. Scratch brushes are also employed in the lathe, and they are circular in form.

The condition or finish of the surface of the article affects the condition of the surface of the deposit; that is to say, if the article be bright, the deposit will be bright, but if the surface be rough or dead, the deposit will be the same. At the same time, too highly polished a surface of the article will not take such an adherent deposit as a somewhat less highly-finished one would do. It is often expedient to deaden or bite a too highly-finished surface by dipping it in a strong acid solution.

Cleansing Solutions.

For cleansing copper, brass, German silver, and other copper alloys, heat to the boiling point in a cast-iron pot—*not tinned*—a lye solution of the following composition: 2 ozs. of caustic potash to the pint of soft water. In this hot solution the article should be suspended after having been cleaned by brushing and rinsing in water and having been mounted on a copper wire, as before described. Any article with soldered joints should not be left too long in the hot lye, as the caustic potash attacks it and is apt to blacken the surface of the article. Rinse thoroughly in running water.

When the surfaces of the articles are much oxidised they should be immersed in a pickle composed of sulphuric acid, one part, water eight parts, and kept in it until the oxide coating is removed. It should then be thoroughly rinsed in running water and immersed in a solution of cyanide of potassium—60 grains of cyanide to the pint of water. On removing the article from this bath it should be brushed all over with pumice stone powder moistened with this solution. It should then be dipped again in the cyanide solution, rinsed in running water, and immediately placed in the plating bath. When the deposit is to be gold or silver, the articles undergo another process of amalgamation, which will be described later on. When the articles are of copper, brass, &c., they may be immediately immersed in a pickle of sulphuric, nitric and hydrochloric acids and water in the following proportions: water one part, sulphuric acid one part, nitric acid half part, and a few drops of hydrochloric acid; instead of the latter a small quantity of common salt will answer equally well. A dipping acid of this nature can be purchased already prepared. The article after having been pickled is washed in running water as before, and before being placed in the plating bath is dipped in a solution of the dipping acid, kept fresh for the purpose of this final dip. Up to this stage the article is sufficiently prepared for a deposit of copper; but when a deposit of gold or silver is required, a further amalgamation process is required, as above mentioned. This consists of dipping the article, previously cleansed by either of the above processes, in a solution composed as follows: water one pint, nitrate of mercury 102 grains, sulphuric acid 90 grains. A black deposit is formed on the article, which, on rubbing, becomes a bright surface of mercury; it should be immediately placed in the depositing bath.

For iron or steel articles, a pickle composed of water one pint, hydrochloric acid ½ lb., the article having been first cleaned in the caustic lye first described; on removing it from the pickle just mentioned it should be immediately immersed in the plating bath. Zinc articles may be treated as above, care being taken to give them a dip in a strong acid bath before placing them in the depositing trough.

Tin, lead, and alloys of these metals, should be dipped in the caustic lye bath, but not in any of the acid pickles described; they should be immediately placed in the plating bath without washing. There is some difficulty in getting a good deposit of gold or silver on these articles directly; but if a deposit of copper be first formed, the deposit of gold and silver is much more readily obtained.

Articles which have been previously plated and which it is desired to replate, should have all traces of the first plating removed, otherwise a satisfactory result is not to be obtained. This can be done by means of the scratch brush, or by chemical processes, depending upon the plating to be removed. If gold, by dipping the article in *aqua regia*—a mixture of hydrochloric and nitric acids. If silver, by suspending the article in strong sulphuric acid and saltpetre kept at a gentle heat. Copper may be removed from silver by boiling it in hydrochloric acid; and tin and lead, or their alloys, may be removed from the article by a solution of hydrochloric acid and jeweller's rouge, heated to near the boiling point.

Working Students at South Kensington.

The following letter from Colonel Donnelly was published by the leading daily papers on March 1, which, in view of the importance of the step taken by the Educational Council, and of the beneficial results that are likely to accrue from it, we reproduce.

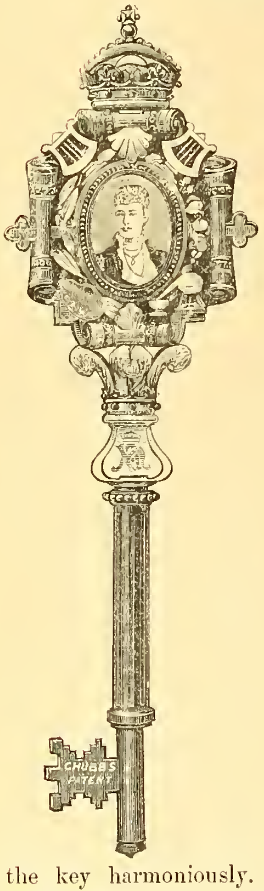
Sir,—I am directed to request that you will be so good as to allow me, through the medium of your columns, to inform manufacturers and others engaged in industries in which art is more or less concerned, that the Lords of Committee of Council on Education have decided to make arrangements for the admission of a limited number of persons employed in those industries, to study in the South Kensington Museum, Library and Schools, without the payment of any fees, for periods of from two to nine months according to circumstances. Detailed rules with regard to these working studentships will be sent on application to the Department. Briefly, the conditions may be stated to be that the designer or workman, for whom admission is sought, shall show that he has sufficient power of drawing and sketching to be able to profit by the opportunities afforded; that he is actually engaged in some art industry; and that the proprietors of the works in which he is engaged undertake to maintain him while he is studying at South Kensington. When admitted, the working student will be set, under direction, to study in the Museum and Art Library from examples relating to the industry in which he is employed, and he will also receive instruction in drawing and designing in the Art School, suited, as far as may be, to his special case. My Lords have taken this step with a view to render the Museum of more special and direct use to the country, and they trust that the valuable collection of examples of applied art which has now been brought together may thus be more fully appreciated and taken advantage of by the directors of industry in the country.

I am, Sir, your obedient servant,
J. F. D. Donnelly.

Science and Art Department, *February* 28.

Opening of Alexandra House.

PRESENTATION KEY.



The accompanying cut represents the key made by Messrs. Chubb & Son for the opening of Alexandra House, Kensington Gore, and which was presented to the Princess of Wales on that occasion: the 14th of last month.

The design for this Presentation Key was suggested by the architect, C. Purdon Clarke, C.I.E., and is based upon the style of the building itself, the bold scrolls at the four leading lines of the head forming a striking and appropriate result. The enamelled photograph of H.R.H. the Princess of Wales occupies the centre of the obverse, while emblems relating to the avocations of the lady students at South Kensington—music, drawing, painting and scientific inquiry—are displayed at intervals between the scrolls. The key is surmounted by the Princess's coronet and the Prince's feathers; from the capital of the column, a wreath of laurel and oak partly encircles the centre portrait. The column of the key is fluted like the Corinthian pillar; above it is a lyre-shaped plaque, having the monogram of Alexandra House in gold letters on enamel, and this, with the surrounding coronet, unites the two parts of the key harmoniously. The enamels are in best style, and the reverse of head is carried out with the same careful working of emblematic details and scroll decoration.

Patent Office.

The Report of the Committee appointed in December, 1885, by the Board of Trade to inquire into the manner in which the Patent Office was carrying out the Patent Act of 1883, was published on Saturday, 5th ult., together with the evidence taken by the Committee. The Committee recommend that the practice introduced by the Act of 1883 of warning applicants of the existence of unpublished applications likely to conflict with their own should be dropped. In the opinion of the witnesses this practice had failed, and it was calculated that the repeal of the provision would result in a saving of £300 to £400 a year. In the case of a patent being abandoned in consequence of a filed but unpublished description, the Committee thought that the fees should be returned. The present system of examining applications appeared to the Committee to be too elaborate, and they considered that it might be simplified by diminishing the excessive amount of supervision exercised. The alterations, it was believed, would set free some of the staff, who might then be employed in working up the heavy arrears in the publications of the Office. The Committee further recommend that any amendment required by the Patent Office should be supplied within a month, or that the patent should date from the time when it was so supplied, instead of from the time of the original application; and they advise that steps should be taken with a view of fixing a standard of qualification for the title of patent agent. If the proposed alterations are adopted, the Committee suggest the appointment of another committee after a sufficient time has elapsed to test the working of the Office.

There are estimated to be nearly 100 places in the Black Forest where the manufacture of clocks and watches forms the staple industry. Ninety years ago, the production was about 75,000 annually; in 1808 it was 200,000; in 1880 it reached as much as 1,800,000, nearly 500,000 being sent out from one place.

At the Birmingham County Court last month, Walter Clarence Carter, of 84, Aston Street, pawnbroker, sued Walter J. Grinder, Augusta Street; Hymen Levetus, Vittoria Street; and L. W. Pendleton, Northampton Street, jewellers, to recover £25, which the defendants agreed to pay to plaintiff in consideration of his producing to them for their inspection certain articles deposited with him as security. Mr. J. O. Dale appeared for the plaintiff, and Mr. Hugo Young (instructed by Mr. Pepper) for the defendants. Defendants were appointed in May last as trustees of the estate of a jeweller named George Henry Whiston, under a deed of assignment for the benefit of creditors. Witness had previously borrowed about £500 or £600 from plaintiff, and deposited with him by way of security a large quantity of jewellery. On May 31 the defendants called upon plaintiff, and asked him to show them the jewellery he had belonging to Whiston. He objected to do so without some consideration, and the defendants offered him £5. Whiston had given bills for the amount of the money borrowed, and plaintiff told the defendants that one of the bills, amounting to £20, would fall due next day, June 1. He offered to show them the jewellery if they would pay that instalment and the £5, making a total amount if they decided to redeem. According to plaintiff's case the defendants agreed to do so, but observed that as they had not brought sufficient money with them they would forward the amount. He accordingly produced the jewellery, and they inspected it. A day or two afterwards Whiston's affairs were thrown into bankruptcy, and the defendants were displaced as trustees and refused to pay him the £25. They offered him £5, but he would not accept it. He had sold the jewellery for £385, and made a loss of £100 on the transaction with Whiston. The defence was that the plaintiff had agreed to show the defendants the jewellery for the sum of £5, and they agreed to pay the instalment of £20 falling due the next day if they decided to redeem the goods. Whiston had represented the value of them to be £700 or £800. They offered £5 to Carter, but he had refused it. His Honour Judge Chalmers, in giving judgment, said that when defendants went to see the jewellery, Carter had really the whip end of them. He could name his own terms, and he had, according to his evidence, made up his mind to do so when he knew the defendants' errand. It was probable that the defendants, speaking altogether, were not quite sure of the exact arrangement that was made. He could not help thinking that Carter had carefully specified his own terms for the inspection, and he must give a verdict in his favour.

A New Odontograph.

[*Communicated to the Franklin Institute by*
George B. Grant, *Boston, Mass.*]

My object is to explain the construction and operation of an odontograph, or rather, an odontographic method, which is not only arranged with special reference to convenience and ease of operation, but which is also as accurate as can be desired for all ordinary purposes of construction or drafting.

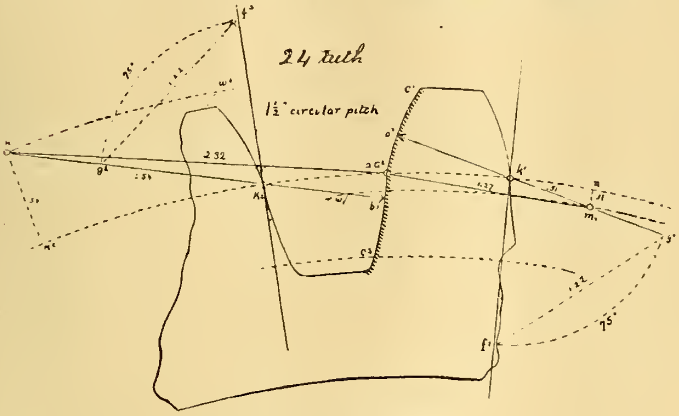


Fig. 1. Willis Odontograph.

In my business, which is specially devoted to the construction of gearing, I formerly had frequent occasion to make use of the well-known Willis odontograph, which has practically been the only one in use for 30 years past.

When using this instrument, the method, as illustrated by Fig. 1, is as follows:—(1) The pitch circle is divided off for the pitch points. (2) A radius is drawn to the pitch circle. (3) The instrument is laid on the radius. (4) The positions on the instrument, of the centres, are found by the use of a table. (5) Circles are drawn through the centres. (6) The tooth-curves are all drawn in from centres on the centre-circles.

It occurred to me, after wading through this process many times, that much of the work could be got rid of by calculating the results of the process and arranging them in a table. The real object in view, in the process outlined above, is to get the positions of the circles that contain the centres, and the lengths to set up on the dividers when drawing the tooth-curves. I constructed and for a time used a table giving the distances m^1 n^1 and m^2 n^2 of the circles of centres, and the radii a^1 m^1 and a^2 m^2 for the tooth-curves. The result was that much of the labour was avoided and the accuracy of the result greatly improved. It is a work of great skill to so handle the Willis instrument that the same example will give the same result when the operation is repeated, while the use of the table will give uniform results without trouble. The two methods are identical as to the position of the resulting tooth-curve.

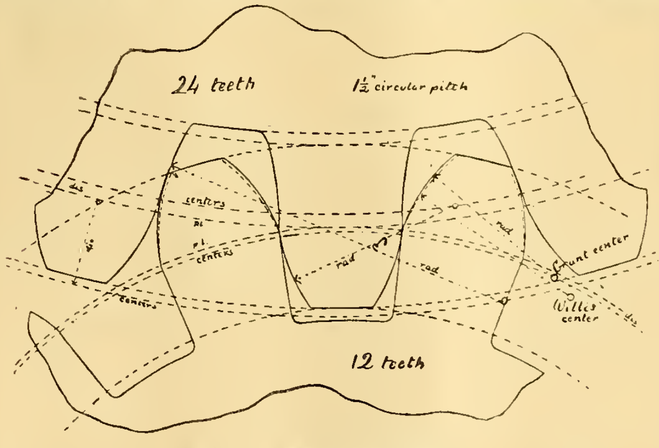


Fig. 2. Epicycloidal Teeth.

It afterwards occurred to me that the process would be in no way lengthened, or its difficulty increased, if the centres, found by the use of the table, were the centres of the circles which most nearly coincide with the true curves, instead of the Willis centres of the osculatory circles at the centres of the curves, and this is the method here given and illustrated by Fig. 2 and the Table I.

The method adopted for the construction of the table was a mathematical process, tested by graphical processes. I first computed the co-ordinates of the points of the true curve at the addendum point and at the centre of the curve, then the co-ordinates of the centres of the circles that pass through these two points and through the pitch points, and then the actual lengths of the radii of the circles as well as the distances of the centres of circles from the pitch lines. It is obvious that these circles are as close to the true curve as circular arcs can be made.

Grant's Odontograph Table I.—Epicycloidal Teeth.

Interchangeable Series.
From a Pinion of Twelve Teeth to a Rack.

Number of teeth in the gear.		For one diametral pitch. For any other pitch, divide by that pitch.				For one inch circular pitch. For any other pitch, multiply by that pitch.			
		Faces.		Flanks.		Faces.		Flanks.	
Exact.	Intervals.	Rad.	Dis.	Rad.	Dis.	Rad.	Dis.	Rad.	Dis.
12	12	2.01	.06	∞	∞	.64	.02	∞	∞
13½	13-14	2.04	.07	15.10	9.43	.65	.02	4.80	3.00
15½	15-16	2.10	.09	7.86	3.46	.67	.03	2.50	1.10
17½	17-18	2.14	.11	6.13	2.20	.68	.04	1.95	.70
20	19-21	2.20	.13	5.12	1.57	.70	.04	1.63	.50
23	22-24	2.26	.15	4.50	1.13	.72	.05	1.43	.36
27	25-29	2.33	.16	4.10	.96	.74	.05	1.30	.29
33	30-36	2.40	.19	3.80	.72	.76	.06	1.20	.23
42	37-48	2.48	.22	3.52	.63	.79	.07	1.12	.20
58	49-72	2.60	.25	3.33	.54	.83	.08	1.06	.17
97	73-144	2.83	.28	3.14	.44	.90	.09	1.00	.14
290	145-rack	2.92	.31	3.00	.38	.93	.10	.95	.12

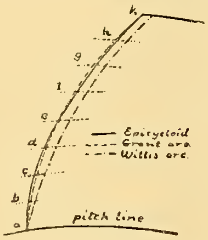


Fig. 3.

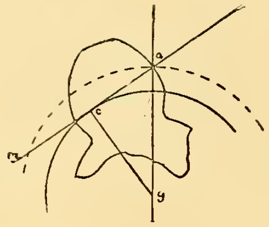


Fig. 4.

The improvement made in accuracy is illustrated in Fig. 3. The new arc crosses the curve twice, coinciding with it at three points, while the Willis arc leaves it at the pitch line and thence runs entirely inside of it. The following table gives the errors of both arcs at nine points of a twelve-tooth pinion of a diametral pitch of unity, computed with great care to four places of decimals, or ten-thousandths of an inch. It is seen that the average error of the old curve is about six times that of the new.

	New Curve.	*Willis.*
At *a*	·0000	+·0000 inches.
„ *b*	+·0088	+·0175 „
„ *c*	+·0091	+·0244 „
„ *d*	+·0056	+·0283 „
„ *e*	·0000	+·0288 „
„ *f*	—·0036	+·0297 „
„ *g*	—·0061	+·0308 „
„ *h*	—·0046	+·0342 „
„ *k*	·0000	+·0397 „
Average	±·0042	+·0260

The greatest error of the new arc is at about the quarter point *c*, and for a tooth of a diametral pitch of unity, twice the size of the tooth of Fig. 2, this maximum error is as follows:—

For 12 teeth *c* = ·009 inches.
„ 20 „ *c* = ·008 „
„ 40 „ *c* = ·006 „
„ 100 „ *c* = ·004 „
„ 300 „ *c* = ·002 „

The new curve is the most accurate, approximating most nearly to the true curve, at the point of the tooth, where accuracy is most needed, and where the Willis arc is most at fault.

Fig. 2 shows the two processes applied to a twelve-tooth pinion, the full arcs being by the new process and the dotted arcs by the Willis process. As the number of teeth increases, the accuracy of both arcs improves, until, for a very large gear either arc practically agrees with the true arc.

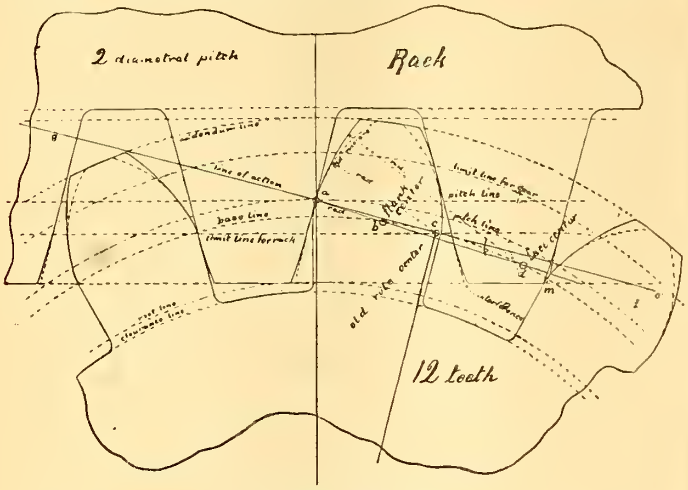


FIG. 5. INVOLUTE TEETH.

It may reasonably be claimed that the new arc is as near to the true curve as it is necessary to get, for hand and eye processes cannot appreciate a greater accuracy. It is doubtful if anything but the most delicately-constructed shaping engine could form a templet with a smaller error, for it is found in practice that templets constructed with the greatest skill by ordinary means, must be brought into shape by hand and eye processes, before they are ready for use for the purpose of making gear cutters. The writer does not know of a purely mechanical process used in the construction of gear teeth that will give closer results, except the Bilgram originating machine.

GRANT'S ODONTOGRAPH TABLE II.—EPICYCLOIDAL TEETH.

RADIAL FLANK TABLE.

FOR ANY POSSIBLE PAIR OF GEARS, NOT INTERCHANGEABLE.
One Inch Circular Pitch.
For any other pitch, multiply by that pitch.

NUMBER OF TEETH IN GEAR BEING DRAWN.		NUMBER OF TEETH IN THE MATE.											
Exact.	Intervals.	12	13 14	15 16	17 18	19 21	22 24	25 29	30 36	37 48	49 72	73 144	145 rack
12	12	.64 .02	.64 .01	.65 .01	.66 .01	.67 0	.68 0	.69 -.01	.70 -.01	.71 -.02	.73 -.02	.74 -.03	.75 -.03
13½	13-14	.65 .02	.66 .02	.67 .01	.68 .01	.69 .01	.70 0	.72 0	.74 -.01	.75 -.01	.76 -.02	.78 -.02	.79 -.03
15½	15-16	.67 .03	.68 .02	.69 .02	.70 .01	.72 .01	.74 .01	.75 0	.78 0	.79 -.01	.82 -.02	.84 -.02	.84 -.03
17½	17-18	68 .04	.70 .03	.71 .02	.73 .02	.75 .01	.77 .01	.78 .01	.82 0	.84 -.01	.87 -.01	.89 -.02	.90 -.03
20	19-21	.70 .04	.72 .04	.74 .03	.76 .02	.79 .02	.81 .01	.83 .01	.87 0	.90 0	.93 -.01	.96 -.02	.96 -.03
23	22-24	.72 .05	.74 .04	.76 .04	.79 .03	.82 .02	.84 .02	.87 .01	.91 .01	.94 0	.98 -.01	1.01 -.02	1.03 -.03
27	25-29	.74 .05	.76 .05	.79 .04	.82 .04	.85 .03	.87 .02	.92 .02	.96 .01	.99 0	1.03 -.01	1.07 -.02	1.10 -.03
33	30-36	.76 .06	.79 .05	.83 .05	.86 .04	.90 .03	.94 .03	.98 .02	1.02 .01	1.06 0	1.11 0	1.17 -.01	1.23 -.02
42	37-48	.79 .07	.83 .06	.86 .05	.90 .05	.96 .04	.98 .04	1.03 .03	1.08 .03	1.14 .02	1.20 0	1.25 0	1.37 -.01
58	49-72	.83 .08	.87 .07	.91 .07	.96 .06	1.02 .06	1.05 .05	1.10 .04	1.17 .04	1.24 .03	1.30 .02	1.43 0	1.58 0
97	73-144	.90 .09	.93 .08	.97 .08	1.01 .07	1.07 .07	1.11 .06	1.18 .06	1.28 .05	1.34 .04	1.47 .03	1.65 .02	2.03 0
290	145 rack	.93 .10	.96 .09	1.00 .09	1.05 .09	1.10 .08	1.16 .08	1.24 .07	1.37 .07	1.50 .06	1.70 .04	2.12 .03	2.90 .02

The Beale epicycloidal engine of the Brown & Sharpe Manufacturing Co. will shape theoretically correct templets and templet gears with the greatest precision, the errors being all within a thousandth of an inch in magnitude, but, unlike the Bilgram machine, it has not as yet been applied directly to the shaping of the teeth of working wheels. But machines of this class can hardly be compared with odontographs, as their expense puts them beyond reach for ordinary drafting or constructive purposes.

The principal application is to the interchangeable system of gear-teeth, but I have also applied it to the case, sometimes met with in practice, of teeth with radial flanks, not interchangeable. The upper number in each square of the Table II. is the face radius, while the lower is the centre distance. As shown by the table, most of the centres are inside the pitch line, some are on the line, while others, those having the negative sign, are outside of it.

A great advantage of the new method is that it can be applied to the involute form of tooth as well as to the cycloidal form. The involute is superior to the cycloid, theoretically and practically, but the Willis process does not apply to it, and, if drawn at all, it is generally by the ridiculously inaccurate method shown by Fig. 4. By this simple, but worse than worthless method, the line *a c* is drawn at an angle of 75½° with the radial line, and then the tooth-curve is drawn from a centre, *c*, at a distance *a c* of one-quarter of the radius. Nothing could be simpler, and it would be difficult to contrive anything further from the truth, for the result on a twelve-toothed pinion is shown by the dotted lines of Fig. 5.

GRANT'S ODONTOGRAPH TABLE III.—INVOLUTE TEETH.

INTERCHANGEABLE SERIES.
From a Pinion of Twelve Teeth to a Rack.

NUMBER OF TEETH IN THE GEAR.		FOR ONE DIAMETRAL PITCH. For any other pitch, divide by that pitch.			FOR ONE INCH CIRCULAR PITCH. For any other pitch, multiply by that pitch.		
Exact.	Intervals.	Base Distance.	Face Radius.	Flank Radius.	Base Distance.	Face Radius.	Flank Radius.
12	12	.20	2.70	.83	.06	.86	.27
13	13	.22	2.87	.93	.07	.91	.30
14	14	.23	3.00	1.02	.07	.95	.33
15	15	.25	3.15	1.12	.08	1.00	.36
16	16	.27	3.29	1.22	.08	1.05	.40
17	17	.28	3.45	1.31	.09	1.09	.43
18	18	.30	3.59	1.41	.09	1.14	.46
19	19	.32	3.71	1.53	.10	1.18	.50
20	20	.33	3.86	1.62	.10	1.22	.53
21	21	.35	4.00	1.73	.11	1.27	.57
22	22	.37	4.14	1.83	.11	1.32	.60
23	23	.39	4.27	1.94	.12	1.36	.63
25	24- 26	.42	4.56	2.15	.13	1.45	.70
28	27- 29	.45	4.82	2.37	.14	1.54	.77
31	30- 32	.50	5.23	2.69	.15	1.67	.88
34	33- 36	.57	5.77	3.13	.17	1.84	1.00
38	37- 41	.63	6.30	3.58	.19	2.01	1.16
44	42- 48	.73	7.08	4.27	.22	2.26	1.38
52	49- 58	.87	8.13	5.20	.26	2.59	1.70
64	59- 72	1.07	9.68	6.64	.32	3.09	2.18
83	73- 96	1.39	12.11	8.93	.42	3.87	2.90
115	97-144	1.92	16.18	12.80	.58	5.16	4.15
192	145-288	3.20	25.86	22.30	.96	8.26	7.30
576	289-rack	9.60	73.95	70.10	2.88	23.65	22.30

INTERFERENCE

FOR TWELVE TO RACK INTERCHANGEABLE SET.

TEETH In the Gear.	12	13 14	15 16	17 18	19 21	22 24	25 29	30 36	37 48	49 72	73 144	145 ∞
PITCH.	AMOUNT OF THE INTERFERENCE.											
One in. cir.	.003	.007	.007	.007	.007	.007	.010	.010	.010	.013	.017	.020
One diamet'l	.01	.02	.02	.02	.02	.02	.03	.03	.03	.04	.05	.06

Interference always to commence at a point half-way between pitch line and addendum line.

The new method, as applied to the involute, is given by the Table III., and illustrated by Fig. 5. The base circle is first drawn at the tabular distance from the pitch circle, and then the faces and flanks are drawn in with the tabular radii, from centres on the base circle. The supplementary table shows the necessary correction, for interference, on the points of the larger gears.

TABLE OF THE LENGTHS OF PENDULUMS.

FOR THE USE OF CLOCKMAKERS.

VIBRATIONS IN ONE MINUTE.	LENGTHS OF PENDULUMS.	VIBRATIONS IN ONE MINUTE.	LENGTHS OF PENDULUMS.	VIBRATIONS IN ONE MINUTE.	LENGTHS OF PENDULUMS.	VIBRATIONS IN ONE MINUTE.	LENGTHS OF PENDULUMS.
60 Seconds Pendulum	39·2	85	19·5	110	11·6	135	7·7
61	37·9	86	19·0	111	11·4	136	7·6
62	36·7	87	18·5	112	11·2	138	7·4
63	35·5	88	18·2	113	11·0	140	7·2
64	34·4	89	17·8	114	10·8	142	7·0
65	33·4	90 ⅔ Seconds Pendulum	17·4	115	10·6	144	6·9
66	32·4	91	17·0	116	10·4	146	6·6
67	31·4	92	16·6	117	10·3	148	6·4
68	30·5	93	16·3	118	10·1	150	6·2
69	29·6	94	15·9	119	9·9	152	6·0
70	28·8	95	15·6	120 ½ Seconds Pendulum	9·8	154	5·9
71	27·9	96	15·4	121	9·6	156	5·8
72	27·2	97	15·0	122	9·4	158	5·6
73	26·4	98	14·6	123	9·3	160	5·5
74	25·7	99	14·3	124	9·1	162	5·3
75	25·0	100	14·1	125	9·0	164	5·2
76	24·4	101	13·8	126	8·8	167	5·0
77	23·8	102	13·5	127	8·7	170	4·8
78	23·1	103	13·3	128	8·6	174	4·6
79	22·6	104	13·0	129	8·4	180	4·3
80 ¾ Seconds Pendulum	22·0	105	12·8	130	8·3	186	4·0
81	21·5	106	12·5	131	8·2	192	3·8
82	20·9	107	12·3	132	8·1	200	3·5
83	20·4	108	12·1	133	8·0		
84	20·0	109	11·8	134	7·8		

⁂ The measurements are given in inches and their decimals, and are calculated from the point of suspension to the centre of the bob.

Heraldry in Modern Art.

By J. W. Tonks.

[By the courtesy of Mr. J. W. Tonks, of the firm of T. & J. Bragg, Vittoria Street, Birmingham, we are enabled to publish the following, which is the full text of an interesting lecture delivered at Queen's College last month before the members of the Birmingham Architectural Association.]

It is impossible to look carefully upon the movements of applied art in England without being impressed by the evidence of the growing favour and adoption of heraldic forms and devices. In public buildings from which the old classicism is gradually disappearing, where lions' heads, acanthus leaves, or blocks of square-cut stone were almost the sum of permitted decoration, there is now the later Renaissance or the bounteous Gothic spirit, admitting the introduction of the heraldic blazon in endless form and variety. So in interior decoration, the heraldic motive, which was once the occasional or subservient element, has become the leading principle for any important public work, and is brought prominently forward wherever possible in the arrangement of schemes of ornament for private dwellings. One of the most complete instances I know of this mode of treatment is in the interior of the Lancashire County Hall, at Preston. The revival of a pure taste for stained glass in this country has also given a remarkable impetus to the use and display of heraldry. The dark or grey tones of our northern skies have been kindled into flame or made to glow with somewhat of the golden hues of morning—have been deepened into sapphire or gemmed with the emerald and the carbuncle, by being led to play in varying moods, as the day wore on, through the translucent glories of heraldic achievement and the symbolised honours of the storied past; and if the window has been made interesting or magnificent by heraldry, the pavement has not been forgotten: the ramping lion, the fuming gryphon, and the writhing serpent, each have been brought to tell their history. The rose, the lotus, the lily and the laurel of the mosaic, each have heraldic significance and help us to understand that in ornament, as in nature, there are "sermons in stones." In wood-carving and furniture, again, the armorial bearing is of enhanced importance. In fretted aisle, in screen and stall, the pride of man, perhaps, rather than the devotion of the penitent, often permits the family blazon or the historic coat, while the symbolic references to the Author and the precepts of Christianity move the mind more directly when given in accepted heraldic form. The bookcase, the sideboard, the wainscot, the panel, the door-frame and ornament, the mantel and the chair, all become eloquent with settled meaning and attest their intimate relations with the private owner or the public body through this vehicle of conventional expression. Decorative brass-work, again, reserves its central efforts for this powerful and speaking form of art, while the goldsmith, in the casket, the key, the presentation piece or the personal ornament, finds it the most valuable help in obtaining his most superb and delicate designs.

Coming from art in the house and its furniture to the fertile realm of literature, nothing is more remarkable in these later days than the added interest and research which are given to heraldic subjects. It happened that some few years ago I first became acquainted with a work descriptive of adjacent counties, which was not lacking either in detail or in humour. But when the author, who had allowed me to see it—too late for any suggestions to be of service in recasting it—asked my opinion of it, I frankly told him I was sure it would fail of any permanent success, because it omitted what was absolutely necessary in a work of such a character—the correct rendering and explanation of the arms of the incorporated towns and cathedral cities, together with those of the ancestral coats and cognisances of the important local families. Time proved the correctness of my view even more swiftly than I had feared; and, in spite of much merit in other departments of the work in question, I was sorry to find that, very recently, copies of the books were to be had, unsoiled and uncut, at less than half the cost of the binding.

Coming to less important specimens of literature, it is noteworthy how the crest and motto, or the family coat, have become inseparably connected with the amenities of social life. Hardly an invitation card, a menu stand, or a notice referring to any public festivity, but bears its testimony to this fact, and the customs of municipal magnates spread rapidly into private circles. The letter paper, envelope and writing card are now indeed so commonly heraldic with people possessing any pretensions to style, that it sometimes fills one with wonder at finding one's self in the midst of a crowd of ladies and gentlemen whose armorial bearings would indicate high lineage and a long chain of ancestry, but whose personal history and bearing points to a sudden rising from the ranks of the untitled world.

It would be a valuable course of inquiry how far this development of taste for heraldry in England has been coincident with its commercial supremacy, and with the growing importance of the middle classes. It would be a public service to trace how nearly it was related to the masculine progress of a great and free people, proud of its noble traditions, of its ancient history, and its past achievements; but, fascinating as such subjects might be, I can only glance at them in passing to another feature of the modern heraldic revival which is of strictly artistic interest. What is most valuable in this revival is, that it is not merely a renewal of the heraldic taste which did prevail largely in what may be called the Georgian period, but that it has been an awakening from the debased heraldic style of that period, and a true adoption of an earlier and purer art canon. This I can best explain by means of a few definitions as to the nature of heraldry itself.

Although symbols and ensigns have been used in all times to distinguish titles, names and dignitaries of state, there is little evidence to show that heraldry, as a system (whether of art or science, we need not stay to discuss), existed before the latter part of the 12th century. At that time the crusades were being preached, and the thronging multitudes who crowded to the Holy Land—drawn from many nations and speaking many languages, drawn also from provinces of the same nation which did not understand each other's speech—needed some means by which they might recognise each other, and also know their national or local leaders. A device for the knight or captain, also devices for his band of followers, was a necessity, and these devices became related together by details, and subordinated to great national cognisances. On the summit or crest of his helmet, the king bore the distinguishing symbol of his line and nation; the knight bore the recognised emblem of his family or his province, and the prelate the distinctive badge of his diocese and office. In days when few men could read, and still fewer could speak more than one language, when uniforms had not been invented, a figured system of symbols, which kept the different parts of these great cosmopolitan armies together and in proper relation to the whole, was an urgent initial need. It therefore grew and developed rapidly into an elaborate system during the chivalric ages; and until the end of the 15th century was held in the highest esteem. It was treated as a grave science, with all the disquisitions and conceits of ponderous learning, until the gloss of accreted tradition obscured its original simplicity. It then fell into ridicule with the fall of the chivalric spirit, and began to be regarded by reformers, Roundheads and levellers generally, not as a science but an art, and an art withal of a vain and frivolous kind.

The shield of the knight who went forth for the first time without any family bearing, being thus plain, represented the open field on which he was entering, and on which his achievements might be recorded. It might be afterwards painted crimson, in memory of a sanguinary battle in which he had been engaged, charged with a lion, to indicate the dauntless courage he had displayed in the fight; an eagle, on the other hand, would indicate the vigilant swiftness of his action; while the erased or torn-off heads of wolves or leopards, the cruelty or the desperate violence of the enemies with whom he had to contend. A walled crown would indicate his conquest of a city; an olive wreath, the conclusion of an honourable peace.

Crests came afterwards as the special distinction of a leader of an army, or a reward of an act of heroism. I cannot explain this better than by instancing the crest of Viscount Downe. It is technically described as "A demi-Saracen in armour, holding in the dexter hand a ring: gold, stoned azure, and in the sinister a lion's gamb, erased, or."

This crest was granted to his remote ancestor, Sir William D'Aunay, who, having slain a Saracen prince and afterwards killed a lion, cut off the paw of the lion and presented it to the king. The sovereign, to record his high sense of these brave actions, gave the warrior a ring from his own finger (which is still in the possession of the family), and authorised him to wear the crest which the present Viscount Downe now bears.

Supporters came later, and also mottoes, which began to be of service when a larger proportion of the population were able to read and understand them. But this slight sketch of the nature and purpose of heraldry leads us directly to the main object of the inquiry. As heraldry was essentially symbolic, so its early representation was essentially conventional. The representation was not a mere drawing of the being portrayed, as nearly like nature as possible, but it was an arbitrary sketch which emphasised those qualities which the symbol was intended to indicate. Take, for instance, a lion—the most frequent and most honoured heraldic type; instead of a fat, well-bred creature, ancient representations show him lean, hungry, and with his tongue out ravening for prey. His claws and paws are amplified for the like reasons: and each position in which he is placed is held to indicate some attitude of dauntless courage. When couchante, with his face directed towards the spectator, he first represented the observant courage of unquestioned sovereignty. When rampant, as in the arms of Scotland, he is supposed to symbolise the active courage of magnanimous rule. When passant guardant, as in the arms of England, he is held to indicate the aggressive courage of vigilant resolution. When statant guardant, as in the crest of the Howards, it is believed to prove the prudence of true courage. The lion salient, or in the very act of springing, shows by a forcible gesture the essential element of valour. The lion sejant, or sitting on his hind quarters, represents courage in council; and when reguardant, or the head turned back in the direction opposite to that in which the animal is advancing, it is held to express circumspection or courage in retreat. This one example will serve to show how ingeniously heralds were able, by these painted devices, to explain to the unlearned many qualities and characteristics which they were anxious to mark as particularly possessed by their leaders. The conventional rendering of one sentiment in one way caused it to be immediately recognised, and thus added meaning and importance to the heraldic blazon.

But it must not be assumed that the lion enjoys a special share of this conventional and symbolic treatment. The eagle closely follows him in this respect. Equally gaunt and ravenous in form, its talons, its spread wing and tail feathers, its powerful head, neck and beak, are fully emblematic of vigilant and rapacious power. Other birds of prey follow, each animal in turn is pressed into the service, and then plants and flowers take their turn, equally subject to the laws of conventional heraldry. Thus the art became a long code of signals invaluable in those unlettered ages, and giving due notice of the character and position of all who might bear arms.

It is of much interest to architects to note that in the palmy days of English Gothic, when the finest cathedrals in this country were built, and the most exquisite examples of its succeeding periods were produced, Gothic art was accompanied by a perfected conventional and Gothic heraldry. But with the decline of Gothic art came decline of pure and noble heraldic drawing. The blazon became exaggerated and defaced with the unmeaning reducers of the Louis Quatorze and Rococo. The shapely and decisive shield of the earlier days was exchanged for the squat and formless shield, elaborated out of all proportion, bordered with a series of scrolls joined together at their ends but having no bond of union. The vegetable forms became naturalised and redundant, the lions obese and torpid, the eagles blear-eyed and with wings too heavy for flight, and the treatment verging on the pictorial instead of the heraldic. Thus for a time the glory of heraldry had departed, and, with the reign of pure Gothic and the days of chivalry, it seemed as if it was to suffer a final eclipse and decay.

(To be continued.)

APPLICATIONS FOR LETTERS PATENT.

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

2,740. M. Constable and J. R. Bingle, London, for "An improved process for the extraction of gold, silver and other metals from ferriferous ores containing same" (complete specification). Dated February 22, 1887.

2,797. G. Pritchard. Birmingham, for "Improvements in solitaires, collar studs, cuff links and other like dress fasteners." Dated February 23, 1887.

2,895. E. Edwards, a communication from L. Kniep, Germany, for "Improvements in watch escapements." Dated February 24, 1887.

2.902. J. F. Pouget, London, for "Improvements relating to means for affixing pieces of nacre, artificial jewels and the like to wood and other substances." Dated February 24, 1887.

3,167. W. H. Beck, a communication from La Société Rousselle, Frères, Tirein et Cie.. France, for "Improvements in buttons or studs." Dated March 1. 1887.

3.180. T. Morcom, St. Austell, for "Safety barrel wheel for preventing damage to the movements of watches should the mainspring break." Dated March 2, 1887.

3,357. W. Potter, Jun.. London, for "A hook for holding jewel, pipe cigar, card and similar cases, and for displaying same." Dated March 4, 1887.

3,455. J. Sadler, Northampton, for "A spring and special pin for the purpose of making a universal movement in solitaires, studs or buttons; also adapted as a fastener for gloves, boots and other articles of dress, umbrellas, bags, purses and the like articles: to lessen their cost of manufacture, and to improve, simplify and make more durable, more reliable and secure. and better adapted for fastening or securing articles as aforesaid." Dated March 7, 1887.

3,638. J. Darling, Glasgow, for "An improved watch key." Dated March 10, 1887.

3,828. T. P. Hughes, London, for "Improvements in cases for containing jewellery, chiefly for exhibition purposes." Dated March 14. 1887.

3,878. H. Boardman, Bradford. for "Improvements in or connected with electric alarm clocks." Dated March 15, 1887.

3,971. G. W. Pridmore, Birmingham, for "A new or improved scarf-pin protector." Dated March 16, 1887.

4,128. C. S. Proctor and S. Compton, Newcastle-on-Tyne, for "An improved method of suspending or attaching watches, bags and other articles." Dated March 18, 1887.

4,135. H. J. Haight, London, for "Improvements in electro-magnetic self-signalling, self-alarm and self-recording thermoscopes, a part of which is applicable to electro-magnetic clock-time transmitters" (complete specification). Dated March 18, 1887.

Meetings of Societies, &c., for the Month.

SOCIETIES.	APRIL.
Inventors' Institute, Lonsdale Chambers, Chancery Lane	4, 18
Photographic, 5*a*, Pall Mall East	12
Society of Arts, John Street, Adelphi	20, 27
Geological, Burlington House	6, 27
Numismatic, 22, Albemarle Street	21
Mathematical, 22, Albemarle Street	7
Royal Astronomical, Burlington House	—
Royal Meteorological, 30, Great George Street	20
Geologists' Association, University College	1
Royal Microscopical, King's College	13
Quekett Microscopical Club, University College	22
British Archæological Association, 32, Sackville Street	6, 20
Royal Archæological Institute, Oxford Mansion, Oxford Street, W.	21
Royal, Burlington House	21, 28
Antiquaries, Burlington House	*23, 28
Physical, Science Schools, South Kensington	23

Watch and Clock Makers' Pension Society.—A Dinner will take place, in connection with the above, at the Holborn Restaurant, on Wednesday, April 27; Captain Penton, M.P., in the chair.

Clock and Watch Makers' Asylum.—The Thirty-fourth Annual Meeting of the donors and subscribers to the above will be held in the Schoolroom adjoining the Martyrs' Memorial Church, St. John Street Road, on Monday, the 18th inst., at 7 p.m., when, in addition to the usual business, the following alteration in Rule is to be considered:—"That all unsuccessful candidates have the votes polled carried forward for the next and succeeding elections, provided they are not otherwise disqualified."

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* Anniversary Meeting at 2 p.m.

Gazette.

Partnerships Dissolved.

Benjamin Greaves & Sons, Leeds, file manufacturers. Topham & Simpson, Pendleton, Salford, pawnbrokers. Betts & Sons, Birmingham, refiners.

THE BANKRUPTCY ACT, 1883.

Receiving Orders.

To surrender in London.—George Lund and Frederick Moralt Blockley, Pall Mall and elsewhere, watchmakers. Thomas William Harris, Brook Street, Hanover Square, jeweller. Walter George, King Street, Clerkenwell, manufacturing jeweller.

To surrender in the Country.—Esther Harris and Sarah Harris, Swansea, pawnbrokers. John Lee, Manchester, jeweller. John Sheldon, Stockport, jeweller. Arthur Jack, Cheltenham, jeweller. James Miles, Leamington, watchmaker. Thomas Robert Collyer, Highbridge and Burnham, watchmaker. Arthur James Cotton, Great Yarmouth, silversmith. Francis Raynes Lineham, Scarborough and Newark-on-Trent, watchmaker. Thomas Shaw, Birmingham, wholesale jeweller.

Public Examinations.

In the Country.—J. Sheldon, Stockport, jeweller: April 28, at 11.30. J. Miles, Leamington, watchmaker; April 19, at 2. A. J. Cotton, Great Yarmouth, silversmith; April 19, at 11. A. Jack, Cheltenham, jeweller; April 14, at 12. F. R. Lineham, Scarborough and Newark-on-Trent, watchmaker; April 5, at 2.30.

Day for Public Examination adjourned *sine die.*

F. G. Dandridge (trading as the Clerkenwell Watch Co.), late Newgate Street, City; April 6, at 12.

Adjudications.

In the Country.—W. H. Winstone, Cardiff, jeweller. A. J. Cotton, Great Yarmouth, silversmith. J. Lee, Manchester, jeweller. J. Miller, Leamington, watchmaker. T. R. Collyer, Highbridge and Burnham, watchmaker.

Notices of Dividends.

In London.—M. J. Goldsmid, Clerkenwell Road, manufacturing jeweller; 5d., second and final; March 29, E. H. Collins, 19*a*, Coleman Street, E.C. J. J. Tosen, King William Street, City, and elsewhere, watchmaker: 3s. 4¼d., first and final; any Thursday, 5, Hatton Garden, E.C.

In the Country.—A. H. Kirk, Lewes, watchmaker; 3s. 9d., first and final; March 22, Official Receiver, Brighton. J. Field, Bristol, jeweller: 10s. 2d., first and final: March 28, Official Receiver, Bristol. A. Sattele, Lincoln, watchmaker; 1s. 4½d., second and final; on and after April 5, G. Jay, Lincoln. W. J. Anderson, Carnforth, watchmaker: 1s., second; any Wednesday, Seear, Hasluck & Co., 23, Holborn Viaduct, London. H. G. Bloor, Sheffield, electro-plater; 1s. 10¼d., first and final; April 4, Official Receiver, Sheffield.

Correspondence.

All Letters for Publication to be addressed to the Editor *of* The Watchmaker, Jeweller and Silversmith, *Imperial Buildings, Ludgate Circus, E.C.*

All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.

To the Editor of *The Watchmaker, Jeweller and Silversmith.*

Sir,—In reference to your notice in last month's issue, concerning the Triumph Lathe, we should like to add the following:—The accuracy with which the parts are made to interchange is such that there are separate bars (12 and 14 inch) now supplied at a small extra cost. These bars are a perfect fit as well for one as for all, the accessory fittings being equally applicable. The convenience afforded by having one or two extra bars is that the lathe head-stock and turn arrangements may be kept separate and save the trouble and time of shifting the parts, thus obviating the great drawback which exists in all other combination tools.

We are, Sir, yours truly,
R. Haswell & Sons.

49 & 50, Spencer Street, E.C., *March* 17, 1887.

[BREGUET BALANCE SPRINGS.]

Sir,—Will you permit me to take exception to the following paragraph of X. O. N.'s article on this subject in your March number. He says: "As to his (the retail watchmaker's) consideration for the comfort or convenience of the jobber into whose hands the watch may come for repairs, the thing is too absurd to be thought of, his business is to sell the watch." I hope, for the credit of our trade, a higher moral view than this is taken by us of the interest of our customers who buy and wear our watches. I look upon it as the duty, as well as being to the interest of the retail watchmaker, to buy for stock those watches that he believes will, for many years, be satisfactory in his customers' hands; they must also be of such construction that his jobber will be able to clean them satisfactorily, for he is entirely dependent upon *him* for his own reputation—there is no evading this—unless he adopts the only alternative of doing all the work himself. I think few will question the statement that the watchmaker who does his jobbing best is the one to effect most sales of new watches. For my own part, I have much consideration for a good jobber, who is sometimes found competent to clean a turret clock, pivot in a verge, staff and cylinder, and usually handles a flat balance spring without spoiling it; but I would draw the line in applying Breguet springs to common watches, and thus save him an unnecessary trouble, and the owners of the watches unnecessary annoyance, in having many of them spoilt as *timekeepers*, as they inevitably will be.

I am, Sir, your obedient servant,
J. D. Fisher.

Lincoln, *March* 14, 1887.

Buyers' Guide.

The Sheffield Smelting Company, Sheffield, *Sell* Gold and Silver (pure and alloyed). *Buy* all materials containing Gold and Silver.

F. W. Powell (now **Fowler & Powell**), Colonial Buildings, Hatton Garden, E.C. Wholesale only for Gold and Silver Jewellery; Silver Cigar, Cigarette and Card Cases, Match Boxes, Salt Cellars; Silver and Glass Smelling Bottles; Sovereign Purses.

Jones, E. A., Wholesale Manufacturer of Whitby Jet Ornaments. A Large Assortment of the Newest Patterns always in Stock. Export Orders promptly executed. Persons not having an account open will avoid delay by forwarding a reference with their order. Customers' Matchings and Repairs with despatch. 93, Hatton Garden, London, E.C.

For cheap, quick, reliable Watch and Jewellery Repairs, by the most Experienced Workmen, send to Alexander Edwards, Watch Material and Tool Dealer, 88 & 89, Craven Street, and 2, Holyhead Road, Coventry. Lists: all Horological Literature.

M. W. Skelton, Inventor and Manufacturer of Fusee Keyless and other Watches, Liverpool. Manufactory: 6, Park Place. New Wheels and Pinions. Conversions and Jobbing done in general for the trade. Country orders promptly attended to.

WANTED.

A VERY Experienced SPECIALIST MANUFACTURER seeks some GENUINE FACTORS for a NEW CHRONOGRAPH which defies all competition as to price, soundness and efficiency. The Chronograph acts as a simple chronograph, counter and fly-back. Offers to be addressed in writing to H. 730 Q, à Messrs. Haasenstein & Vogler, Bâle, Switzerland.—[Advt.]

A MOST conscientious WATCH MANUFACTURER at Bienne, Switzerland, who has a thorough knowledge of the article, and from an experience of many years is thoroughly acquainted with the English style, who has vast premises and a number of first-rate workmen at his disposition, wishes to enter into BUSINESS RELATIONS with a large and conscientious WHOLESALE BUSINESS IN ENGLAND, in order to supply the same with GENEVA WATCHES. Offers to be addressed H. 1546, to Haasenstein & Vogler, Editors in Basel, Switzerland.—[Advt.]

TO BE SOLD.

ELECTRIC CLOCK, with show pendulum, in grand case, going to ten seconds a month. Price £9 9s.—cost double. Dixon, Coleshill Street, Birmingham.—[Advt.]

WATCHMAKER'S and JEWELLER'S BUSINESS, established 17 years, in busy manufacturing city; stock moderate and will be reduced. Excellent opening for a young man starting business. For particulars, address *The Watchmaker, Jeweller and Silversmith* Office, London.—[Advt.]

The

Watchmaker, Jeweller and Silversmith.

Edited by D. GLASGOW, Jun.

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The Watchmaker, Jeweller and Silversmith.

A Monthly Journal devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

Subscription.—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

Advertisements.—The rates for advertising will be sent on application. The Watchmaker, Jeweller and Silversmith will be found an exceptional medium for advertising. Special Notices, Situations, &c., per insertion, 1s. for two lines, prepaid.

Correspondence.—Correspondence is invited on all matters of interest to the trade. Correspondents will please give their full address in each communication, not necessarily for publication, but as a guarantee of good faith.

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Imperial Buildings, Ludgate Circus, London, E.C.
Cheques and Postal Orders to be crossed and made payable to J. Truslove.

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Hunter Street and Royal Arcade, Sydney, N.S.W.

Editorial.

NOTWITHSTANDING the stimulus given to manufacturers by the anticipation of a largely increased demand on the part of buyers during the present year, a consideration of the reports from the various industrial centres leads to the conclusion that the increase of business has been for some time more apparent than real.

The abnormal activity prevailing at the commencement of the year, which was based on expectations that have been only very partially realised, has given place to a corresponding quietude, and complaints as to the badness of trade are once more being heard from all quarters.

A comparison of the totals under the various heads, as given in the Board of Trade Report for the three months ending March last, with those for corresponding periods of preceding years, would not afford a very reliable estimate as to the condition of the trades with which we are concerned, from the misleading character of statistics when applied to analyses of this kind. It is certain, however, that the totals both of imports and exports have been very much swelled, during the period under consideration, by the large quantity of Jubilee specialties put into the market, which further emphasises the fact that a demand can be created and new markets found, where necessary, by putting a continued pressure on buyers and the public by means of judicious advertisement, using the expression in its broad sense.

It would be hard to account for the continuous depression: that it is not altogether due, however, to the exceptional fiscal arrangements of this country is clear from the fact that the Continental trade is even in a worse condition than our own, and in the United States, from whence a big "boom" was announced as taking place in the beginning of the year, things are now almost at a standstill.

Unfair foreign competition has, doubtless, had a good deal to do with the falling off in English trade during the past few years, and it is to be sincerely hoped that the Merchandise

Marks Bill will, if it ever becomes law, effectually prevent a repetition of such a state of things as that announced the other day to the President of the Board of Trade by the Sheffield deputation, who stated, among other things, that as much as twenty tons of German goods had arrived in Sheffield in one day to be marked as of Sheffield manufacture.

Among bushels of discouragement it is a relief to find a few grains of consolation, and the assurance of the Chancellor of the Exchequer, in his recent Budget speech, that there is a change in the direction of improvement of business generally, should be received with satisfaction. As fancy manufactures and articles of luxury are the first to suffer from a wide-spread depression of trade, so are they the first to feel the effect of a revival. We trust the "merry month," upon which we are now entering, may prove the harbinger of a prosperous summer.

NOTHING of the kind, probably, has for many years awakened so universal and wide-spread an interest among lovers of precious stones as the coming sale, on the 12th inst., of the French Crown Jewels.

Not only among dealers and experts is there a state of speculative excitement, but among all classes of the public of the civilised world there exists a manifest expectancy as to the results.

The gems to be brought to the hammer next Thursday week (the official catalogue of which, together with the conditions of sale, will be found on another page) have been on view in the "Salle des Etats" of the Louvre since the 20th of last month. They are made up of over 60,000 brilliants, opals, rubies, pearls, amethysts, &c., &c., the value of which it would be extremely difficult to appraise. They have been roughly estimated to represent an annual loss to the nation of some £20,000, and it may be readily conceived that the Government of the Republic will be very glad to get the responsibility of such a white elephant off their hands.

When the magnitude of a transaction which is to dissipate the historical collection of a great nation is considered, it is not surprising that the nation concerned should be affected to a greater or lesser extent; but the manner in which various other communities are agitated, affords a wide field for reflection.

The number of commissions in the market from that quarter indicate that a large proportion of the gems will go to the United States, though there are not wanting signs that a considerable part of the collection will be appropriated for the feminine portion of the French plutocracy; both of which circumstances seem to show that a love for personal adornment obtains under all systems of government, which is satisfactory from a jeweller's point of view.

A NEARLY PERFECT SIMPLE PENDULUM.—Mr. J. T. Bottomley, of the Glasgow University, suspends a small shot of about $\frac{1}{16}$ in. in diameter by a single silk fibre (half a cocoon fibre), two feet long, in a glass tube three-quarters of an inch in internal diameter, and exhausts the latter to about one-tenth of a millionth of an atmosphere. Starting with a vibrational range of one-fourth of an inch on each side of its middle portion, the vibrations can, it is said, be easily counted after the lapse of fourteen hours.

General Notes.

IT is gratifying, in the midst of continued complaints as to the badness of trade, to be able to note an improvement. Sheffield trade with the United States continues to increase in value. For the quarter ending March last the exports reached a total of £205,787 19s. 11½d., against £121,971 8s. 6d. for the corresponding quarter of 1886.

A CORRESPONDENT of a contemporary points out that instead of the term "works," in the Merchandise Marks Act Amendment Bill, of which we suggested the necessity of a definition in our last issue, the word "entrails" is used in an old State document to describe the internal economy of a timekeeper.

THE *Engineer* of the 8th ult. contains an interesting article on Stop-watches and Chronographs, which, although written for the public, and avoiding, therefore, technicalities as much as possible, is well worth perusal by watchmakers. The article, which is necessarily condensed as regards details, describes chronologically the principal stop-watches that have been in use from the time of Rieussec to the present day, and the text is elucidated by means of some excellent illustrations.

MR. STUART WORTLEY, M.P., announces that he is giving his attention to the question whether legislation directed against false marking can be effective without a clause prohibiting the importation of unmarked goods. Such a clause would be of a far-reaching character, as it would to a great extent insure the recognition of foreign-made goods. No Bill at present before Parliament contains any provision of the kind.

MR. EDWIN W. STREETER suggests, in a recent letter to *The Times*, that the difficulty with respect to foreign watches could be easily surmounted by in future stamping all foreign cases with a distinctive hall-mark and the movements with the name of the country of their origin, and making it illegal for anyone to sell a foreign-made watch not bearing such distinctive marks.

ACCORDING to Dr. Waldo, there is not a single school in the United States devoted to instruction in horology, although more than 100,000 people are dependent on this industry, in which more than 100,000,000 dols. of capital is at the present time invested. He thinks a school should be founded there on the same broad principles which underlie the medical colleges, and with due attention to its mechanical branches. Such a school would be feasible in connection with the Boston Institute of Technology, and 600 dols. per year ought to be a paying basis for each student.

ACCORDING to a recent report of the British Consul at Oporto, the Germans have taken complete possession of the cutlery trade, which was formerly in the hands of English manufacturers. With the report the Consul has forwarded specimens of the cutlery most commonly dealt in by the Portuguese retailers, which are now on view at the Cutlers' Hall, Sheffield.

As an example of the necessity for personal attention and canvassing in finding new markets for our manufactured goods, the following short extract from a recent Consular report from New Orleans speaks for itself. The writer says:—"I have not heard of or seen a British commercial traveller in New Orleans during the last fifteen years. Latterly I have received by post many price lists and illustrated trade magazines, which are of no use, our men of business hardly caring to accept them. What they require to see is the thing itself." What strikes one particularly in the above paragraph is that it will apply equally well to almost any other part of the world. Are even our own Colonies exhaustively advertised as to our productive capabilities? The answer is to be found by consulting any of the Colonial papers, where for one English advertisement there appear a dozen foreign; and our agencies exist in about the same proportion.

The Master, Wardens and Court of Assistants of the Worshipful Company of Turners, according to their custom, propose to offer this year their silver medal, the Freedom of the Company to, and (subject to the consent of the Court of Aldermen) will also obtain the Freedom of the City of London for, any workman, whether master, journeyman or apprentice in the trade, in the United Kingdom, who may send in the best specimen in each of the following, viz.: hand turning in wood, in glass, and in precious stones. Prizes will be awarded. Amateurs will be allowed to compete as a separate class.

The Astronomical Congress held its first sitting on April 16. It is international. England is well represented. The object of the congress is to take means to make the most complete celestial map that has ever been executed, from observations and photographs taken all over the world. These photographs will be according to the system of the brothers Henry, photographers to the Paris Observatory. Their negatives will be subjected, under strong light, to powerfully-magnifying microscopes, which enable the eye to detect thousands of stars in parts of the sky where only hundreds have yet been discerned.

Our old friend, Mr. W. G. Schoof, has just had a well-merited lift in *Engineering*, in an article on Marine Chronometers. The writer calls attention to the numerous instances in which ships have been lost owing to the failure of these instruments consequent on their liability to disarrangement from shocks and outward disturbances, and points out the immunity of the resilient escapement in this respect. As Mr. Schoof has devoted much time, labour and money to his inventions, a recognition such as the one under notice should be hailed with satisfaction by horologists generally.

Machine-made Watches.—A correspondent of *Industries* says that the Swiss watchmakers, recognising the danger from American and other foreign competition, are doing all they can to improve the condition of this industry. The existing schools for watchmakers are being re-modelled, in order to make the instruction more comprehensive and of more practical value, and most of the larger manufacturers are endeavouring to maintain their position in the markets of the world rather by good workmanship and originality of design than by manufacturing articles of the cheap and useless type. The importance of the watchmaking trade for Switzerland will be readily seen from the following figures:—In Geneva alone there are 300 shops, giving employment to about 10,000 hands. In the Neufchatel district there are employed about 15,000 hands, whilst in Canton Berne the number of persons engaged in this trade amounts to 20,000. In Solothurn, where, in 1840, there was only one manufactory for watches, there are now sixteen, giving employment to over 2,000 hands. The total number of works, in the beginning of last year, engaged in the manufacture of clocks was 1,363, and in the manufacture of watches, 1,223; whilst watch cases were made in 340, and other accessories in 397, works. The total number of persons employed in the watch trade throughout Switzerland amounts to nearly 100,000. The value of exported watches and watch cases during 1885 amounted in round figures to £3,150,000, of which £800,000 worth went to Germany, £670,000 worth to England, £345,000 worth to Austria-Hungary, £300,000 worth to France, and £275,000 worth to Italy.

The suit of Messrs. Joseph Rodgers & Sons, Limited, of Sheffield, against the Acmé Silver Co. and George Rodgers, of Toronto, has been settled by a decree in Chancery allowing George Rodgers to use his own name and trade marks on goods, provided he places the word Toronto below in letters as plain and legible as those which form the name of Rodgers. "This," says the Canadian *Trader*, "we do not suppose he will have any objection to do, and if it eases the minds of the Joseph Rodgers Co., Limited, it will not do the Toronto Rodgers any harm." Possibly not—but why did he not do so at first? This is the sort of decree a good many English firms would like to get with regard to Continental-made goods.

The well-known and old-established business of Messrs. Creswick & Co., silversmiths and platers, of Sheffield and London, was disposed of during the past month. Their trade mark (six arrows crossed), which was registered in 1887 and referred to before the Select Committee of the House of Commons on Gold and Silver Hall-marking, 1878, as having attained a great reputation, was sold for the low price of £115.

Harrington's patent tube chimes, to which public attention was first drawn at the Inventions Exhibition, are again being brought into notice. Messrs. Evans & Sons, of the Soho Clock Foundry, Birmingham, are now making striking and chimney clocks fitted with the tubes, and the inventor has just secured another patent for a contrivance for using them with an ordinary non-striking clock. This comprises an electrical attachment, which is actuated by the pendulum at the quarters and hours, the mechanism thereof being quite independent of and apart from the clock train.

A new emery wheel has been recently introduced to the English market by Messrs. Bagshawe Bros., of 106, Fenchurch Street; this is called by its manufacturers (the Hart Emery Wheel Co., Limited, of Hamilton, Canada) "The Detroit Solid Emery and Corundum Wheel." The wheel is cast in two discs, held together by a wire web insertion, which, while not affecting the cut in use, renders it practically unbreakable by accidental blows or ill-usage; and it is claimed that the mixture of the "corundum" with the emery gives an ever keen and fast cut, far superior to the ordinary silicate and emery or glue and emery wheels at present in use. These wheels have been in general use in Canada and the United States for some years.

J. W. King, so many years in business at 15, St. John's Square, Clerkenwell, as dealer in stones and jewellers' materials and electro-plater and gilder, has just opened additional premises at 13, St. John's Square, for the extension of his gilding and plating business, to which he has added nickel and copper depositing. The new works are fitted up in the most complete manner, with steam power and modern electrical machinery, and will be lighted throughout with the electric light.

The Melbourne Exhibition.—The Prince of Wales has accepted the honorary presidency of the Melbourne Centennial Exhibition of 1888.

The Yorkshire Jubilee Exhibition.—A large portion of Mr. Felix Joseph's valuable collection of old Wedgwood ware has just been removed from the Nottingham Castle Museum for loan at the Saltaire Exhibition, which opens on the 6th of May.

The Diamond Market.—No improvement marks the condition of the Continental trade, and little business has been done during the past month, which was one of exceptional dulness. This is to be partly accounted for by the interruption to trade caused by the Easter holidays, but the buyers of Amsterdam and Antwerp complain of the high prices demanded for rough stones, which, they assert, leave little or no margin of profit on the finished goods at the present prices ruling for the latter. Nevertheless the manufactories are reported fully occupied, and a general improvement is expected. The *Paris* trade has been likewise below the average; few foreign buyers are reported present, and the little business done being only in small parcels. The *London* market has been equally quiet. Plenty of all classes of stones has come to hand, but the prices demanded being high, little business has been done. The steamers, "Hawarden Castle," "Spartan," "Tartar," "Pembroke Castle" and "Mexican" have arrived at Plymouth since our last report, bringing fair average parcels from the fields. An advice from *Kimberley*, dated March 26, states that the tone of the market there had decidedly improved, the goods selling freely at advanced rates—all classes of stuff being in strong demand.

SILVER.—A considerable fall in the quotations took place shortly after our last report went to press, and business was so flat at the beginning of last month that the market was in a condition of semi-panic. On the allotment of the India Council drafts, however, a much firmer tendency was shown and quotations have been since maintained (with the usual slight fluctuations), closing at 43⅞d. for bars and 43d. for Mexican dollars. It is the general opinion that the market could be kept much steadier and panics avoided were the India Council, in issuing the drafts, to give more consideration to the current prices.

American Items.

THE *Jeweler's Weekly* says the action of the Legislature in referring Assemblyman Finn's bill, to regulate the sale and manufacture of jewellery and other metallic wares by the introduction of quality marks, for consideration by the Committee on Trades and Manufactures, is regarded as ominous of its ultimate death. While the measure as a preventive of misrepresentation would be salutary, it is by no means clear that such misrepresentation is practised in the trade to an extent harmful to the legitimate dealer, or, indeed, demanding the attention of the Legislature. Assuming an evil of this class to prevail, the imposition of a penalty, as proposed by Mr. Finn's bill, does not improve the existing state of the trade law, of which *caveat emptor* is by no means an unimportant maxim. It is the duty of a person entering into the contract of sale or purchase to satisfy himself by all means at command of the quality of the commodity purchased, and if he is deceived by the artifice of the vendor, to have recourse to his civil remedy for damages, which is both speedy and adequate.

THE case of M. J. Paillard & Co. against Jacot & Son was determined in the New York Circuit Court, before Judge Wallace, on March 29. The claim, which was for damages, arose out of an alleged infringement by Jacot & Son of a patent moveable cylinder-spring adaptable to musical boxes and owned by the plaintiffs. The judge, after a minute examination of the musical box movement tendered in evidence, held that, while the springs employed by the defendants were in a measure identical with those of the Messrs. Paillard, the infringement had not been sufficiently wrongful to merit an injunction or an award of damages. It was argued on behalf of Jacot & Son that the patent held by the plaintiffs was invalid, inasmuch as the improvement it purported to protect was of too insignificant a nature to constitute an invention in the legal sense of the term. The plaintiffs have appealed from this decision to the United States Supreme Court.

"SCIENCE" says:—"There is a move in Pennsylvania to allow the prescription of spectacles only to properly instructed oculists, and to withhold it from opticians, whose duties end with supplying the glasses that have been prescribed. We could adduce here the same arguments that uphold the propriety of permitting none but physicians to prescribe medicines, while druggists may compound the medicines thus prescribed; while the objections to the proposition would come only from those who accept the not uncommon impression, encouraged by most opticians, that the choice of suitable glasses is not a difficult matter. This is true enough in many simple cases, but every oculist can quote examples of harmful effects following the use of lenses not adapted to the needs of the eyes. Few opticians have more than a mechanical training in their art, while the oculist should be a specialised physician. He and his patients deserve the same protection that is extended to other doctors and theirs."

The Hall-marking Question.

LONDON CHAMBER OF COMMERCE.

AN adjourned meeting of watchmakers was held on Monday, the 25th ult., at the rooms of the London Chamber of Commerce, to consider the subject of the Hall-marking of watch cases in connection with the Merchandise Marks Act Amendment Bill.

The meeting was called by circular, and was not confined to members. Mr. John Rotherham, of Coventry, had been invited to take the chair, and there was a good and representative attendance of various branches of the trade: there being present, among others, Messrs. H. M. Frodsham, J. Tripplin (representative of the Besançon Chamber of Commerce), Clemence, D. Glasgow (V.-P. British Horological Institute), Walton, Squire, Newman, Bedford (of the American Watch Company), F. J. Britten (Secretary, Horological Institute), Brown (Secretary, Coventry Watchmakers' Association), and other representatives of provincial watchmakers.

The Chairman, in opening the meeting, said he approached the subject with an open mind, as he considered it a secondary one, and that if English watchmakers were to compete successfully with foreign ones, they must improve their system of manufacture.

Mr. Tripplin proposed a resolution to the effect that the meeting disapprove of the clauses in the Merchandise Marks Act Amendment Bill which relate to the Hall-marking of watch cases. The resolution was seconded by Mr. Clemenee, watch importer.

Mr. Walton, watch case maker, proposed an amendment approving of portions of the Bill, but objecting to the statutory declaration required from the case makers as to the place of origin of the works that are to be put into the case. Mr. Bedford, with some reservations, seconded the amendment; and the amendment being put by the chairman, he declared it carried.

A fresh proposition being made by Mr. Squire, did not find a seconder.

The speeches on the whole were, as is usual with watchmakers, a good deal outside the mark; each speaker having a great many suggestions to add to a Bill, which is already loaded with clauses, that would render its enforcement impossible if it became law.

S. Blanckensee & Son, Limited.

THE business of Messrs. S. Blanckensce & Son, which has been established for some 60 years, represented to be one of the largest jewellery and goldsmiths' businesses in the world, is formed into a limited liability company with a capital of £120,000. The private firm has traded during the period mentioned, and now has establishments at London, Birmingham and Madrid. The public are invited to subscribe for an issue of £80,000 in 10 per cent. Preference shares of £10 each, and the shares are entitled to further participation in profits after 10 per cent. has been paid on the Deferred capital of £30,000, which forms part of the consideration money. The business has been reported upon by Messrs. Chadwicks, Boardman & Co., the well-known firm of accountants, who represent that the profits, exclusive of partners' drawings and after due allowance for depreciation, have been equal to about 14⅝ per cent. per annum on the total capital employed in the business, and they further express the opinion that the new and additional capital of £48,000 can be employed in the business so as to produce even a larger rate of profit than is now realised on the present capital. The stock has been examined and reported upon by Mr. E. J. Watherston, the well-known jeweller and goldsmith of Pall Mall. The full prospectus elsewhere given [see inset advertisement in our last issue] will be referred to for details of division of profits between the Preference and Deferred shares, as the vendors have stipulated that in case the profits for five years do not average 8 per cent., the £30,000 of Deferred capital shall be entirely extinguished. Other contingencies on the favourable side are set out in the prospectus.

Fraudulent Trade Marks.

THE Select Committee appointed by the House of Commons to consider the three measures relating to the question of fraudulent trade marks, met on April 15 to choose a chairman and consider their course of procedure. Among those present were Baron H. de Worms, Mr. J. P. B. Robertson, Mr. Stuart Wortley, Mr. Mundella, Mr. Biggar, Mr. Hoyle, Mr. George Howell, Sir Albert Rollit, Mr. R. Chamberlain and Mr. Hardcastle. Baron H. de Worms was elected chairman, and it was agreed to meet on Mondays and Fridays, A memorial has been forwarded to the Board of Trade from Prescot with regard to the marking of foreign-made watch cases, and it is understood that evidence will be taken from that district as well as from Coventry and Clerkenwell. The preliminary meeting was held in private, but the press will be admitted during the examination of witnesses.

There are three Bills before the House of Commons in reference to fraudulent trade marks: one introduced by Mr. Mundella, and the other two by the Government. One of the Government measures is intended to be a consolidation measure, and the other two are competing Bills. The Committee appointed by the House to consider them met on the 18th ult. to take evidence, Baron H. de Worms (in whose charge both Government measures are) presiding. Mr. Courtney Boyle, Assistant Secretary to the Board of Trade, was examined, and explained the circumstances which had led to the necessity of legislation. Great Britain in 1883 had joined the Union for the protection of patents and designs, and had attended the conference of the Union held at Rome in 1886, when an amendment was proposed upon the decision of the convention of Paris, 1883, with the view of strengthening it. The amendment proposed the seizure of fraudulently-marked goods in all the States of the Union, and one of the clauses of the Government Bill had been framed with the view of giving effect to that recommendation. The Act of 1862 had rarely been put in force, owing to the objectionable nature of the proceedings, which were by indictment, and some simplification of the method of procedure was necessary. The witness would not go the length of recommending that the vendor of a fraudulently-marked article should be punished, as that would introduce a vast change in the habits of trade. Among subsequent witnesses will be the Master Cutler of Sheffield and the President of the Manchester Chamber of Commerce.

Civic Mace for Dewsbury.

A LARGE and elaborate silver-gilt mace has just been manufactured by Messrs. T. & J. Bragg, of Birmingham, as the result of a ladies' subscription in honour of the twenty-fifth anniversary of the incorporation of the borough of Dewsbury. In style it is harmonious with the fine gold mayoral chain designed after Pugin, and also made by Messrs. Bragg, for the Corporation nearly a quarter-of-a-century ago. Four massive arms support the orb and cross, the bars being enriched with tracery, while the fillet is an example of Gothic foliation, with the conventional cross of thorns, suiting the ecclesiastical spirit of the town shield. In this the cross of St. Paulinus, who founded Christianity in that district in the sixth century, is conspicuous, while the hanging fleece, with the cross of Edward the Confessor, gives a timely reference to the industry of the district. These are in enamel, with the borough motto, and on the reverse are the richly-enamelled arms, crest, &c., of the reigning Sovereign. Four Gothic brackets support the head and lead down to the first projecting knop, in which are a series of enamelled carbochens, each bearing a letter, and together giving the name "Dewsbury." The dividing bands are decorated in the style chosen. The lower end of the mace is enamelled with a monogram of the present Mayor and an elaborate inscription.

Mayoral Chain for Queenborough.

IN commemoration of the Jubilee Year of the reign of Her Majesty Queen Victoria, the Corporation of Queenborough, said to be the smallest in England, have secured an important chain of office for their Mayor. The spot where the town now stands was selected by King Edward III. for a town castle, which he made a free borough, and named Queenborough, in compliment to Philippa, of Hainault, his queen. This historical event is quaintly indicated in the borough seal by a castle with towered centre archway, portcullis and bomb-proof towers of a decidedly perpendicular type. Over the larger central tower is seen beaming, large and glorious, the half-length effigy of the famous Queen Philippa. This device occupies, in a large space, the central position in the badge, and is repeated in enamel on all the large links throughout the chain. Queenborough has been favoured in the matter of charters, no less than fourteen being given; these are recorded in a series of alternate links of an ornamental character, having the initial of the town above and the date of charter in an enamelled riband below. The chain is brought to a centre by a charming miniature painting, in enamel, of Queen Victoria, as a special record of the fiftieth year of her reign. The badge, which is Gothic in form with fine finial, has—in addition to the arms of the town, before described, and name in an enamelled circle, surmounted by a civic crown—careful models of mace and fasces in saltire; the date, 1887, in gold figures in an enamelled riband; and, as illustrating the history of the borough, the arms of Edward III., with his lion crest on one side of the badge, and the arms of the present reigning Sovereign, with the crown and crest of England, on the other. These, with wreaths of laurel, complete a decoration of which the makers, Messrs. T. & J. Bragg, of Birmingham, even after their long experience, have every reason to congratulate themselves. It promises to be one of the most successful specimens of their work as celebrating the Royal Jubilee.

Board of Trade Returns.

THE total value of imports of every kind of produce for March amounted to £32,794,930, in comparison with £31,490,937 in the same month of last year, and £32,067,567 in that of 1885. For the three months of this year the imports reached a value of £92,320,046, as against £86,733,845 for the same months of last year, and £96,917,714 for the same period of 1885. The exports also show an increase over those of March of last year, the totals being £19,002,083 and £18,510,072 respectively. In the same month of 1885 the total was £18,181,727. For the three months of this year the total has reached £54,065,951, against £52,106,860 in the same period of 1886, and £53,141,470 in that of 1885.

The clocks and parts thereof imported during March are valued in the above returns at £32,239, as against £33,393 for the same month of last year, and £41,813 for that of 1885. The following statement shows the sources of supply:—

	March, 1885.	*1886.*	*1887.*
From France	£18,689	£16,159	£13,545
„ United States	£12,924	£8,649	£8,317
„ Other Countries	£10,200	£8,585	£10,377

The totals for the first three months of the same years are: 1885, £97,549; 1886, £79,736; 1887, £87,859. The watches and parts thereof imported last month reached a total of £63,465. In the same month of last year the amount was £56,653; and of 1885, £57,181. For the three months of this year the watches imported reached a value of £173,503, against £138,572 for the same period of 1886, and £154,648 in that of 1885. The plate and plated and gilt wares exported during March amounted to £27,197, in comparison with £30,177 for the same month of last year, and £30,749 for that of 1885. The three months of this year show a total of £69,490, against £72,182 for the same months of last year, and £78,729 for the same period of 1885.

The French Crown Jewels.

THE following are the conditions of sale and the official list of the French Crown Jewels, which are to be sold by auction on the 12th inst., and following days :—

Conditions of Sale.

The sale is to be for cash ; but every buyer is free to pay for the lots bought at the time of taking the articles away, which must be within 48 hours of the sale, by depositing ten per cent. of the adjudicated price, at the time of the adjudication, in the hands of the Receiver of the Estate Domains.

Every lot which is not paid for in full will be enclosed in an envelope with the buyer's seal affixed. In default of the immediate payment of the ten per cent. deposit, the article in question will be put up again for sale at the first purchaser's risk, as he will be obliged to re-fund any less value on the previous price that may be realised ; but in case of sur-value, it will become the benefit of the State. Should any buyer fail to claim his purchases within the 48 hours specified, they will be sold at first buyer's risk, as above, without any further notice being given to him.

A sur-tax of five per cent. will be levied on all articles sold, to meet the expenses of the auction. An articlé once sold, no further question as to its value, or reclamation of any kind, will be entertained, the public exhibition of the same being deemed sufficient for a proper knowledge of them on the part of bidders. The weight of the gems and pearls in the set ornaments will be given as information, without implying any positive guarantee. The weight of unset gems and pearls will be indicated and guaranteed. All the articles mentioned in the catalogue may be divided according to the exclusive judgment of the administration. The administration is not bound to follow the exact numerical order of the catalogue.

Further information may be obtained from M. Escriba, Commissioner of Public Auctions, Rue d'Hanovre 6, the official Auctioneer ; or his assistants, M. Emile Vanderheym, Expert at the Court of Appeal, Rue Taitbout 54, and M. Arthur Bloche, Expert, Rue Chauchat 23.

CATALOGUE.

Lot
1. Two Balls, Hairpins, 324 brilliants, weight 150 carats.
2. Two large Bows for shoulder, 1,341 brilliants, weight $282\frac{5}{16}$ carats.
3. Aiguillatton aud Culot, style Marie Antoinette :—Aiguillatton, 222 brilliants, weight $125\frac{15}{32}$ carats ; Culot, 59 brilliants, weight $18\frac{19}{16}$ carats.
4. Three wild Roses, 522 brilliants, weight $129\frac{11}{16}$ carats.
5. One Bow, two Tassels, 2,438 brilliants, weight $136\frac{3}{4}$ carats ; 133 Roses.
6. One Chaton, set with oue brilliant.
7. One Half-moon, 89 brilliants, weight $44\frac{13}{16}$ carats.
8. One Fendeloque, ornament for the hair, 477 brilliants, weight $67\frac{11}{16}$ carats ; 100 Roses.
9. Seven Stars, 215 brilliants, weight $49\frac{13}{16}$ carats ; 25 Roses.
10. One Chain, of four rows, consisting together of 222 brilliants, weight 363 carats :—First row, 33 brilliants, weight $55\frac{1}{2}$ carats ; secoud row, 45 brilliants, weight $74\frac{1}{2}$ carats ; third row, 57 brilliants, weight $96\frac{1}{2}$ carats ; fourth row, 79 brilliants, weight $127\frac{1}{2}$ carats ; one locket, 8 brilliants, weight 9 carats.
11. One Wreath of Gooseberry foliage, composed of sixteen Brooches and Pendants ; 2,314 brilliants, weight $517\frac{3}{16}$ carats ; 353 Roses.
12. One Flower, 58 brilliants.
13. One lot of Brilliants on paper.
14. One lot of Brilliants on paper.
15. Six Briolets (long shaped stones), weight $18\frac{1}{2}$ carats.
16. One lot small Roses, weight 40 carats.
17. One lot small Brilliants, cut and uncut, weight $83\frac{1}{32}$ carats.
18. One Opal (specimen), set with brilliants.
19. One Sapphire, with other coloured gems.
20. Eight round Pearls.
21. One lot of Brilliants.
22. One lot of Brilliants.
23. One lot of Brilliants.
24. Diamonds on paper.
25. One Bouquet for Corsage, 2,637 brilliants, weight $132\frac{5}{16}$ carats ; 860 Roses.
26. Six Brilliants :—One brilliant, weight $6\frac{1}{4}$ carats ; one brilliant, weight $7\frac{29}{32}$ carats ; one brilliant, weight $6\frac{1}{32}$ carats ; one brilliant, weight $4\frac{29}{32}$ carats ; one brilliant, weight $5\frac{1}{16}$ carats ; one brilliant, weight $5\frac{1}{2}$ carats.

Lot
27. One Crown of Emeralds and Brilliants, consisting of 1,031 brilliants, weight 176 carats ; 40 emeralds, weight 74 carats.
28. One Chain, consisting of 32 links, 833 brilliants, weight $621\frac{19}{32}$ carats.
29. One Buckle, for *Ceinture*, 295 brilliants, weight 146 carats ; one brilliant, weight 25 carats.
30. Two Bandolettes ; one front riband, 27 brilliants, weight 101 carats, and one head riband, 41 brilliants, weight 124 carats ; small Brilliants.
31. Ornaments in Turquoises and fancy gems, Crowns, Brooches and Earrings, 3,302 brilliants, weight 434 carats ; 215 Turquoises and fancy gems.
32. Oue Russian Crown, consisting of 1,200 brilliants, weight 405 carats ; 442 Roses.
33. One Crown, Greek style, 326 brilliauts, weight $306\frac{19}{32}$ carats.
34. One Berthe (Breast ornament) :—581 brilliants, weight $185\frac{7}{8}$ carats ; 27 rubies, weight $18\frac{1}{8}$ carats ; 15 sapphires, weight $11\frac{1}{8}$ carats ; 35 emeralds, weight 25 carats ; 29 hyacinths ; 46 garnets ; 41 turquoises ; 48 amethysts ; 2 chrystoprases ; 10 topazes ; 765 Roses.
35. One great Ceinture, of different gems :—34 large Roses, weight 202 carats ; 2,414 brilliants, weight $313\frac{3}{4}$ carats ; 63 pearls, weight 1,164 grains ; two rubies, weight $21\frac{1}{8}$ carats ; four sapphires, weight $29\frac{1}{8}$ carats ; eight emeralds, weight $49\frac{1}{4}$ carats.
36. One Brooch of fancy diamonds, 65 brilliants, weight $109\frac{29}{32}$ carats, the principal stone of which weighs 27 carats.
37. One Parure of gold and mosaic.
38. One Parure, Sapphires and Brilliants, consisting of one Crown, small Crown, Brooches and Ribands :—3,837 brilliants, weight $568\frac{3}{16}$ carats ; 67 sapphires, weight $768\frac{1}{4}$ carats.
39. Four Brooches of Pearls and Brilliants :—266 brilliants, weight $166\frac{11}{32}$ carats ; 28 pearls, weight 1,496 grains ; 520 Roses.
40. One Parure of Pearls :—One row of 362 pearls, weight 3,808 grains ; one row of 542 pearls, weight 6,752 grains ; one row of 47 pearls, weight 698 grains ; one row of 58 pearls, weight 524 grains ; one row of 58 pearls, weight 400 grains ; one row of 38 pearls and nine pear-shaped, weight 1,612 grains ; two bracelets, weight 2,000 grains ; brilliants, weight 40 carats ; two buttons ; five plates ; three lockets.
41. One large Crown of Pearls :—1,998 brilliants, weight $64\frac{11}{32}$ carats ; 212 pearls, weight 2,452 graius. One small Crown of Pearls :—Brilliants, weight 8 carats ; 274 pearls, weight 984 grains ; Roses, weight 2 carats.
42. One Brooch, Pearls and Brilliants :—One large pearl, "La Regente;" four pear-shaped pearls, weight each 100 grains ; two buttons, pearl ; one lot of pearls ; four large brilliants ; brilliants of different sizes, weight 100 carats.
43. One Brooch, "Sevigne" ; 321 brilliants, weight $168\frac{3}{16}$ carats ; three brilliants, weight 36 carats.
44. One Parure, "Tour de Corsage" of Brilliants :—One pendeloque, weight 16 carats ; one pendeloque, weight 14 carats ; one pendeloque, weight 14 carats ; two pendeloques, weight 28 carats ; four pendeloques, weight 32 carats ; eight pendeloques, weight 48 carats ; fourteen pendeloques, weight 50 carats ; one oval brilliant, weight 14 carats ; one pendeloque, weight 12 carats ; one pendeloque, weight 10 carats ; two pendeloques, weight 16 carats ; two pendeloques, weight 7 carats ; pendeloques, weight 150 carats ; different brilliants, weight $288\frac{15}{32}$ carats.
45. One Parure, Rubies and Brilliants, being : Bracelet, Crowns, Balls, Plates, ends of Ceinture, Small Bow, Large Collar, Small Collar, Crowns, Ceinture :—6,042 brilliants, weight $793\frac{14}{32}$ carats ; 399 rubies, weight 410 carats.
46. The Mazarin Brilliants :—One pink coloured, pear-shaped, weight $24\frac{27}{32}$ carats ; one white, pear-shaped, weight $22\frac{1}{4}$ carats ; one large flat brilliant, square, weight $28\frac{7}{16}$ carats ; one large flat brilliant, square, weight $18\frac{19}{32}$ carats ; one large flat brilliant, rounded corners, weight $25\frac{5}{8}$ carats ; one large flat brilliant, long shape, weight $16\frac{9}{16}$ carats ; one large flat brilliant, oval, weight $18\frac{1}{32}$ carats.
47. One Comb, 208 brilliants, weight $438\frac{1}{2}$ carats.
48. Various Precious Stones and Pearls.

Simple Test for Gold.—Rub the metallic object to be tested against a piece of flint provided for the purpose, until a distinct mark is left upon the stone. Upon bringing the flame of a sulphur match in contact with the spot, the latter will remain intact if it has been made with gold, but will disappear if the contrary be the case.

From a solution containing nickel, cobalt, zinc, manganous and ferric chlorides, with tartaric acid and excess of ammonia, potassium ferrocyanide throws down all the metals except the iron. A clear filtrate can be obtained after boiling, but the precipitate cannot be washed. A solution containing 0·00004 gramme of manganese and 0·01 gramme of ferric chloride per c.c. gives a distinct precipitate.

Birmingham News.

From Our Correspondent.

It is a common occurrence here for fifteen or twenty jewellers' travellers to be waiting together at the door of a factor whose buyer is known to be at home, all of them anxious to show their last new pattern; and it is also very commonly the case that the majority of them wait for three or even six hours and then be dismissed without being allowed to show their goods. But it is not often the case that a buyer is at home keeping all the doors locked in order to prevent being solicited for orders, as was the case in two instances this last week; and if this is a fair sign of the times, the jewellers will, like Othello, find "their occupation gone," and will have to seek other outlets for their very numerous dainties and *chefs d'œuvre*. There is, undoubtedly, a very severe depression just now, as is evidenced by the fact of the diamond mounters (who have been the steadiest branch for some time past) working short hours and reducing their number of hands; and the outcry is general, there being very few instances of manufacturers running full time. Some of the hardware travellers report a steady improvement in the Sheffield trades, and if this continues the fancy trades will, no doubt, improve, and the summer may console us for the shortcomings of spring.

* * *

There are evidently a number of people with money to invest who are sanguine of a trade in the jewellery branches, as I hear, from very reliable sources, that Messrs. S. Blanckensee & Son, Limited, has become *une fait accompli*, the shares being nearly all taken up. There has been no great rush, but this, I think, no one expected, the jewellery trade having a bad name as a speculation just now.

* * *

The English Watch Co. are exhibiting their processes at the Bradford Exhibition, which will shortly open. They have re-erected their stand and machinery as at the Birmingham Exhibition, on a rather more extensive scale, and their very interesting and pretty machines, showing all the parts of watchmaking on their interchangeable system, will be attended by twelve of their girl employées and a foreman supervisor, and will, no doubt, prove an immense source of interest to our Northern friends.

* * *

The sentence of nine months' hard labour passed upon Hunt, of New Street, Birmingham, for illegally pawning his creditors' goods, has been generally approved by the trade here, the only criticism it called forth being "serve him right;" and no doubt it will have a very wholesome effect upon persons intending to follow in his footsteps. Jewellers have been the victims of this class of gentry for some years past, and have been unsuccessful in getting them punished; but as this is the second instance lately of punishment being awarded to delinquents of a similar nature, we shall all feel somewhat safer for the future, and it will very much tend to restore the confidence of old, of which we are so much in want.

* * *

The speculative manufacturers of Jubilee work do not seem to have found it the unalloyed blessing they expected or hoped—for some reason or other the public do not buy it. Even upon the occasion of the Queen's visit to Birmingham anything in the way of Jubilee medals or jewellery upon the thousands of spectators were conspicuous by their absence. The only explanation I can see is, that the great mass of the people are short of spare cash and cannot afford even the small amount of one shilling for something to be worn once or twice only.

Anglo-Jewish Historical Exhibition.

An Exhibition bearing the above title was inaugurated on Saturday evening, April 2, by a soirée at the Royal Albert Hall, where, in response to invitations issued be the President, Mr. F. D. Mocatta, there was a large assemblage of ladies and gentlemen, by no means exclusively belonging to the Hebrew race. This Exhibition, which is to be held in the "crush" rooms of the Hall, is, in fact, a vast collection of interesting Jewish antiquities—coins, miniature arks, rings, manuscripts and other curiosities. The Hebrew coins certainly form one of the most interesting as well as conspicuous features, embracing, as they do, eight of the finest collections in Europe. Among these are to be found coins of the Maccabæan family, B.C. 143—37; coins of the Idumæan or Herodian princes, commencing B.C. 37; coins of the Roman Procurators of Judæa, the name "Pontius Pilate" appearing side by side with "Herod;" coins of the first revolt of the Jews, A.D. 66—70; coins struck in Palestine and at Rome to celebrate the capture of Jerusalem; and coins of the second revolt of the Jews, A.D. 132—135. There are many relics of what is termed the "pre-exilian period" in England—that is, the period when the Jews were compelled to leave this country; and from 1657, when they were allowed to return, downwards, there are interesting portraits of celebrated Jewish worthies, the more recent including one of Lord Rothschild taking his oath in the House of Lords—the first Jew ever admitted into the assembly—and one of the popular Sir Moses Montefiore. There is a splendid array of manuscripts, many of them illuminated, and in the Strauss collection are a number of massive betrothal rings of beautiful workmanship. The arks are especially worthy of attention, and among them is a large ark for scrolls of the law from the synagogue of Modena, in walnutwood, with a Hebrew dedicatory inscription: close to which is a time-worn synagogue reading-desk, surmounted by a bronzed eight-branched candlestick. The scrolls include an illuminated copy of the Book of Esther, and a long strip of quaint embroidered work, abounding with early scenes from the Old Testament, this being designed to bind the book of the law. The contributions to this unique Exhibition emanate from a great variety of sources. Besides M. Strauss, of Paris, Mr. R. D. Sassoon, the Earl of Crawford and Balcarres, and Sir Julian Goldsmid, M.P., have placed numerous treasures at the disposal of the promoters of the Exhibition; while the archives of St. Paul's Cathedral and Westminster Abbey have been ransacked to aid in the work of concentrating in one spot an immense number of objects which cannot fail to attract much public interest. The Exhibition, which is to remain open for three months, may be viewed for a very moderate charge, and arrangements have, it is stated, been made with the Metropolitan and District Railway Companies for the ready issue of tickets including the fare and admission. The subway and the arcades are both to be available for visitors.

Foreign Bronze Coins.—Until Tuesday, the 31st inst., the above-mentioned coins will be received at all post-offices in exchange for cash or stamps at the following rates, viz:—Ten-centime pieces: 13 to the shilling; five-centime pieces: 26 to the shilling. No exchange to be made for a less sum than sixpence, the equivalent of which will be 6½ ten-centime pieces.

Two men, named Wilkinson and Jones, were charged before Mr. Newton, at Marlborough Street, on the 18th ult., with being concerned in stealing a diamond brooch, valued at £150, from the shop of Mr. S. J. Phillips, jeweller, of 113, New Bond Street. It was alleged that the accused went into the prosecutor's shop to inspect some jewellery, when one of them took up the brooch and walked out with it. They were remanded.

Heraldry in Modern Art.

By J. W. Tonks.

(Continued from page 199.)

ALL this will prepare us to understand the fact that with the revival of Gothic art, in which Pugin and Ruskin have done so much, as far as the awakening of educated opinion is concerned, there came a revival of true heraldry. It was timid at first, and for a long period humbly followed the advances of Gothic taste. In fact, at the present time, with many who indulge in the luxury of coats-of-arms, there is a manifest predilection for the Georgian heraldry rather than for the pure symbolic and conventional heraldry which is certainly best fitted to convey any meaning that is worth conveying in the terms of the heraldic blazon. One of the greatest obstacles, in fact, to the adoption of the earlier style of heraldry is Heralds' College itself. The Chester Heralds' blue mantles and the whole service of draughtsmen to that antique and leisurely community seem to have become fixed in the old and wicked ways of the eighteenth century blazon. Their lions are still the truly terrible nondescripts of that midnight period of art and architecture, where a process of fattening for some heraldic cattle show had inflated the symbol till all meaning was gone, while certainly the resemblance to the menagerie specimen was as remote as ever. It is a misfortune that in the very centre where we might expect "light and leading" there is still the tame acquiescence in vitiated tradition which tends to retard the progress of true heraldic drawing, and which makes the path of the reformer in this direction all the more difficult and uncertain. To give an instance of how this matter affects the question, I may say that my firm never receive a newly-granted charter of arms, whether from an individual or a corporate community, with an order for some piece of work, whether a seal, a badge, or a corporate decoration, without suggesting the correct drawing of one or other of the charges. But we are constantly met with the objection: How can you alter the drawing as in the charter? If the charge is altered in form will it be officially recognised? It is often in vain to urge that the charge remains, while the mode of drawing is a question of true or false taste. Nine out of ten of the general public are fain to believe that the authorities must be right, and so for a long time to come a spurious mode of representation is likely to be perpetuated.

It is evident, nevertheless, that heraldry in modern art, despite the official obstructions which are thus raised against its progress, is likely to have in the near future many and far-reaching changes. If it were to be merely a travesty in the present of the moods and ideas of the past, without organic or vital relation to the motives or actions of to-day, it would soon cease to be approved or adopted by men of sense, and would fall by its own weight from inanition. But that this is not so I believe I may be able to show by a most interesting branch of the subject. There has been a change silently but surely going on, not so much in the character and bearings of individual heraldry, as in the choice of distinctive arms by corporate bodies. This is, perhaps, inherent in the nature of the case. The man, however lowly born, in the usual acceptation of that term, and who rises to wealth and station, when desiring a coat of arms which shall accentuate his social position, too often places himself in the hands of Heralds' College, with a distinct direction that the official investigator shall seek out some noble family of a similar name in ancient times, and shall, by one means or another, establish his identity with it, and, with some slight difference, give him the hereditary family cognisance. The wish to find a Du Brassey who came in with the motley host of adventurers who flocked to the standard of William the Conqueror, may have been little more than the sarcastic invention of a Society journal; but whether this be so or not, it does express distinctly the frequent tendency of thought of many a self-made man. Instead of doing what the knights and great captains of the Middle Ages did, adopting a symbol or cognisance which had a close relation to the doings or achievements of themselves or their immediate ancestors, they go back to a series of emblems quite foreign to their modern life, and, as a matter of course, render themselves liable to well-earned ridicule. I remember it being a matter of common newspaper comment a few years since that a well-appointed carriage was seen regularly in the West End of London, bearing a very unusual coat of arms. It bore, as charges upon the shield, a knife, fork and gridiron, which was understood to be an unabashed indication of the fact that the owner had acquired his ample fortune by means of the humble occupation of a cook. There was certainly an element of the ludicrous in all this; yet it is open to question whether, with its frank acceptance of the fact of lowly origin, it did not bear favourable comparison with many assumed coats of high lineage and indisputable heraldic honours which have been taken by those who cannot prove the smallest actual title to their adoption.

These tendencies, which have so much hindered the genuine development of individual heraldry, have not so seriously affected corporations. In fact the disposition to arrange municipal coats of arms has gone rather in the opposite direction, and therefore we have this salutary fact that civic heraldry has more truly kept pace with the times, and has more fully expressed corporate individuality. Indeed it is hardly too much to say that the heraldry of municipal boroughs in England has represented pretty accurately the history and development of corporate life. A few instances of this may be useful, as probably affording a hint as to a very interesting line of study.

The city of Winchester, one of the most ancient in the country—for 400 years the seat of sovereignty and the meeting-place of the English Parliament—naturally soon became possessed of a seal and armorial bearings. I have an impression of the ancient silver seal presented to the borough by the first Edward, and a splendid specimen of the art of that period. The resolute and steadfast features of the monarch are evidently a near portrait, and the British lion passant guardant beneath the bust is a fine example of the conventional rendering of ancient heraldry. The king and his cognisance were then sufficient for the Royal City—it was therefore natural that when they did obtain a special shield of arms, it should consist of two supporting lions on the crimson field of the English standard, and a series of castle towers. The castle is, in fact, the main feature of all the town seals of this period. It was the graphic draught of their most important building—of their chief defence—qualified by some distinctive symbol. It powerfully illustrates the historic fact that the towns in those turbulent days could only exist under the shelter of a strong castle, into whose ample courtyard they could fly for safety when danger came, and from whose entrance a body of stalwart and disciplined defenders might issue. It was also much more than a mere sentiment, as the bailiffs, reeves and mayors of these old corporations took care to be on good terms with the neighbouring baron, and to unite with him for the sake of mutual protection. If they often assisted the Norman lord in his pecuniary needs, they took care to obtain from him, at the same time, confirmations of or additions to their local charters; and on great occasions the burgesses, by securing the joint aid of two or more powerful barons, were able even to prevent the Crown trenching upon or disregarding these charters. Froissart, in his day, wrote of the rude English who even dared to shut their gates in the face of the king and to forbid men-at-arms to enter if their charters would be infringed thereby. It will thus be seen that what I call, for sake of distinction, the "castle" period of English corporate heraldry, meant a great deal more than at first appears: it meant the powerful aid of the baron in supporting the young corporation in its helpless years; it indicated the steady growth of industry and commerce under the shelter of the castle walls.

Of course this castle appears in every variety of form and treatment. In Warwick it rises with many turrets, with warders and heralds on the ramparts, with the arms of the earl over the entrance, and the sun, moon and stars, all in the sky, shown with strange conventionality. In Calne it is a bomb-proof citadel, thus indicating a later period. At Queenborough the bust of Queen Philippa is seen rising, large and glorious, over the centre tower. At Neath, trumpets of fame are placed endwise on the castle ramparts, while a series of houses cluster round the tower. The grand old seal of Rochester shows the castle in superb proportions, with two drawbridges and moats, with warders blowing horns and the banner of England flying from the battlements.

The seaport towns did not allow themselves to be outdone by the inland boroughs in the matter of heraldry. The castle sometimes appears here in due conjunction with naval emblems, but the hardy coaster of those days evidently thought more of his war-galley as a defence against the enemy than of his coast fortresses. The baron of the seaboard might build a castle, but he also took equal care of his mimic fleet, while the daring band, half fishermen, half warriors, were ready for each kind of work upon occasion. The famous emblem of the Cinque Ports, the better half of the British lion joined to the rear half of the antique lymphad or war-galley, powerfully illustrates the state of things.

When quieter times came and the cathedral or abbey rose in the city to a greater importance even than the neighbouring castle, it is not to be wondered at that the civic heraldry originated at that period was tinged with the ecclesiastical spirit. Thus at Hartlepool, whither, in the seventh century, the Abbess Hilda had gone from Whitby and founded an abbey, her sweet and gentle memory, centuries afterwards, was honoured in the device of the beautiful seal of that borough. At Faversham again, the Madonna and infant Saviour beneath a Gothic canopy expresses a sentiment common to many corporate seals of that period.

A further stage is marked when shields of arms, strictly such, are adopted in place of the somewhat pictorial but highly quaint and interesting ones of the earlier dates. These arms are usually adopted from the shields of lords of the manor or from those of great houses formerly owners of the surrounding lands. There is a correctness in this and a force of treatment which are very marked in the earlier examples, but it was not unfrequently effected in a way contrary to all rules of the heraldic canon. London, with the cross of St. George on its shield and the sword of St. Paul in the first dexter quarter, is a good example of this forcible blazon. So that of Lancaster—the arms of John of Gaunt differenced—the lion of England combined with the golden lily of France is also expressive. It is curious to observe, in this connection, that the town which of all others in England is known for its small regard of mere custom and traditions, the great town of Birmingham, when first incorporated in 1838, chose for its arms and seal, not a series of symbols relating to its varied and important industries, but went back to the dim and distant past and adopted the paternal coat of the ancient knights of Birmingham.

Since the year 1836, a date remarkable for its sweeping changes in regard to municipal corporations, the tendency of heraldry of such bodies has been in the direction of accurate symbolism of the locality and its industries. Sometimes they may seem a little incongruous—sometimes perhaps prophetic: thus Manchester, as the charge-in-chief of its shield, has a vessel in full sail. This may doubtless refer to the world-wide commerce of the great cotton metropolis, but we may be pardoned for wondering if it had any future reference to the proposed Ship Canal. And if Manchester has omitted from its charge-of-arms a reference to its staple, cotton, the smaller boroughs which have clustered round it have since made up the omission. I must also, in justice to Manchester, add that the crest of the city, representing bees clustering all over the globe, is an apt emblem of the industrious and ubiquitous Manchester merchant, if his class of goods are not specified. But, as I have said, the local industries in that district have a full share of attention. Middleton, one of the newest boroughs, with the cotton-pod and silkworm as charges, combines the arms of the Middletons and Starkeys, as conveying its local history. Darwen has the cotton plant intersected by a fesse and two bars wavy, indicating the river, with its two tributary streams, which flow through the town—the miner and pick crest refers to its worked coal-field. Accrington has in chief the lion of De Lacy, ancient lord of the manor, and the running stag of the Hargreaves family, the founders of its leading industry. It bears, in a fesse, the shuttle for cotton spinning, and at base a representation of calico printing, for the heraldic rendering of which I am responsible. Below is the engraved copper roller; above it the roller carrying the calico. The engraved pattern is seen upon the calico as it issues from the copper roller; and the small leaf-pattern is the parsley, the most successful device of Robert Peel—the father of the great statesman—who obtained from it the trade nickname of "Parsley Peel." It was no small matter, however, to get a novel charge and shield through the ordeal of the College of Arms. The heralds were probably scandalised at an arrangement which had not been hallowed by precedent, and, after twelve months' argument and effort, it was still pending when a personal intervention of Sir Albert Wood's finally gave it due heraldic sanction. I would not deny that there is necessity for constructing heraldry in accordance with fixed laws or principles, but, while this is done, it is idle to expect that there will not be new elements introduced into it more frequently in the future than has been the case in the past. The Crewe seal has the merit of striking out in a new direction, but it is needless to say that its picturesque quarterings have escaped official supervision. It illustrates the progress of locomotion in due order: the pillion, the pack-saddle, the canal boat, the four-horse coach, crowned by a crest representing, by a miniature model, Mr. Webb's last locomotive. A wag suggested for the great railway centre the motto, "In the van;" but the words chosen, "Never behind," may give promise of better time than is always kept at that interesting junction.

Blackpool has surpassed Crewe in its pictorial charges: the large pier, a trip steamer, a bathing machine and a life-boat, with the sea-gull crest, giving a margin for effect, of which the engraver has well availed himself. Rotherham and Wolverhampton have seal devices in which a construction of shields have been brought together, but these I need not stay to particularise. What I have endeavoured to show very briefly, and could explain more at large if time permitted, is that there has been a very steady and persistent effort on the part of corporations to make the heraldry they adopt distinctly emblematic of the special relations of their own districts. The very earnestness of this effort may produce an occasional efflorescence of pictorial or non-heraldic representation; but this very fact emphasises the tendency, and I believe it points in the direction in which individual heraldry should go.

Let it be granted, as I believe it will be generally, that the distinctions of heraldry are worth preserving, not merely for the satisfaction of the archæologist, but to preserve historical associations and the memory of antique nobleness; to preserve a pure sense of family honour; and to furnish an incentive to those in the higher walks of rank and fashion to hand down to their successors an untarnished shield. Let all this be granted, and it follows that it is worth preserving as a living organism, and not as a mere dead relic of the past. A clearly-traced descent may entitle the one so marked by birth to an ancient paternal coat, carrying records of honour through distant ages. But it should be remembered, for the creation of living as against dead heraldry, that almost every step in descent and each ramification of pedigree brings about differences; and these differences should, more especially as they approach the present day, be brought about by the introduction of symbolic charges, referring to doings or characteristics of those by whom they are borne. By this means a healthy change of the heraldic blazon would be effected, which, while still recording the greatness of the past, would give it a vital relation to the present.

When we come to new aspirants to the crest and coat-of-arms, the difficulty is one which should not be slurred over. It is easy for the herald to make a few inquiries and then to hand to the applicant the arms of the nearest family of the same name, without evidence of distinct right or title: but such a course is only calculated to bring the art or the science of heraldry into disrepute. How much more would the blazon be valued if it sought to embody, as in the old days, the doings and history of the bearer or his immediate ancestors. If a distinguished chemist rises to eminence and position, there is no need of his adopting a vial with a label as his shield, or any symbol which would amuse rather than satisfy the artistic eye. Surely he can find, from his chemical marvels, symbols quite as effective as the exploding bomb, the salamander, or the fire-beacon, which are recognised and time-honoured charges. So in every walk of life, the artist, the scientist, the manufacturer, the merchant, who may each seek to set up for themselves and their families a coat of heraldic honour which may be a permanent record of personal progress and evidence of worthy work, may do better by making it distinctive of the present, than by raking up the embers of the past in search for fancied ancestries. This, I am persuaded, is indeed the true course to pursue ; otherwise, heraldry, which needs fresh supplies of emblems for its sustenance suited to the present day, will, at a no distant period, die a natural death. It is not at present dying, as we have seen ; there is a growing desire for its significant distinctions. It remains for the artist to give direction to these distinctions : to infuse life and vigour into them, and to make them instinct with due art purpose. In proportion as he does this he will ennoble the art or the architecture in which he may be engaged, and will raise into a new beauty a system which aims to place permanently before the eyes of all who gaze upon it the virtue and magnanimity of the greatest sovereigns ; the wisdom and foresight of the ablest statesmen ; the skill and achievements of the bravest captains ; and the notable deeds of heroism, sagacity and industry which have been done by men and women of all races, ranks and callings in every quarter of the globe.

Technical Education.

A MEETING was held at Sheffield on Tuesday, April 12, in support of State aid for the promotion of higher and technical education. Mr. A. J. Mundella, M.P., in proposing one of the resolutions, stated that the need for technical education was fully established, and he was satisfied that, if we had taken the steps that we ought to have done twenty years ago, we should have been immense gainers, not only in the increased efficiency of our population, but also in their employment, and in the supremacy of our national industries. He showed what advantage had followed the granting of State aid to the three colleges in Wales, and he urged that the representatives of the ten local colleges in England, who should be accompanied by the mayors of these towns and by other influential persons, should seek an interview with the Prime Minister, and say, "We call upon you to organise the industrial education of the country." Very much could be accomplished by a grant of a hundred thousand a year—a sum which was sometimes paid for a single large gun.

Mr. N. L. Cohen, writing to *The Times* of the 12th ult., says :—"Attention has been lately very eloquently and emphatically drawn to the need of greater public facilities for industrial and technical training. Under the present conditions of commercial competition in the world, the industrial activity of a nation is largely dependent on the knowledge and mechanical skill of its handicraftsmen. With the existing pre-occupations of Parliament it is obvious that we shall have to wait a long time before the adoption of any such national scheme of technical education as that foreshadowed by Lord Hartington. Yet it is conceded that manual training and quickness and special facility in using tools is a greater help to the children of our artisans than even the book knowledge and mental training involved in passing the higher standards of the Elementary Education Act. For the present we must rely on individual liberality and on the munificence of such associations as the City guilds and companies for the provision of public facilities for technical instruction, required alike to maintain our commercial activity and to assist our poorer children in the struggles of life."

White Metal Alloys.

AS so much depends in plating on the quality of the metal on which the outer stratum is deposited, both with respect to the appearance of the goods when new and their durability in use, the importance of its homogeneity can hardly be over-estimated.

A good deal of misapprehension seems to exist as to the meaning of the term "nickel," which is commonly applied (even by those who are well aware of the misnomer) indiscriminately to all kinds of white metal alloys. The principal alloy of nickel is German silver, a triple compound or admixture of nickel, copper and zinc : although another alloy, composed of nickel and copper only, is also in use, chiefly for purposes of foreign coinage, which, however, does not call for special attention here. An instructive article dealing with the above subject appears in a recent issue of a contemporary, an abstract of the principal part of which will be of interest to our readers :—

The casting of German silver is, in many respects, similar to the same operation with brass ; but there are certain important differences. It is found impossible in practice to make German silver by one melting in the pot, the high and sustained temperature necessary to bring about liquefaction of nickel causing excessive loss of the low melting and volatile zinc (spelter). For this reason the nickel is always alloyed in one operation with a portion of the copper, and the zinc and the remainder of the copper, in the form of brass, are added in a separate melting. It is the invariable rule of English casting shops to make one-and-one "mixing" and one-and-one brass ; "mixing," it may be explained, is the name given to the alloy of copper and nickel. This alloy is made in 80-lb. plumbago crucibles heated in a wind furnace, similar to the square section furnaces employed by brass casters, and fed by the best hard coke. It is necessary to use a good coke, since nickel alloys are much deteriorated by contamination with sulphur. About an hour is required from putting in the pot to pouring the metal, and the temperature must be very high. To diminish oxidation, and also to refine the ingredients, more particularly the nickel, borax is always added as a flux. This substance, though possessing many of the properties of an alkali when in aqueous solutions, has powerful acid properties at temperatures beyond redness. The boracic acid it contains is, like silicic, a feeble acid ; but being, like the latter acid, fixed in the fire, it manifests important properties at these higher ranges of temperature, and borax, chemically speaking, contains a more than *normal* quantity of this acid. It will, therefore, be understood how the flux, by inducing a kind of scorifying action, brings about a partial refining of the contents of the pot. Mixing is run into pigs of a few pounds weight, and each of these should, when cold, present an upper surface somewhat concave and covered with transverse wrinkles. If the metal shows a smooth and bloated convex surface, the presence of impurities, and more particularly of sulphur, may be inferred. The casting of the brass for German silver making differs in no important respect from the ordinary manufacture of the same alloy for sand caster's use. The actual making of German silver begins when the mixing and the brass have been obtained. For pig metal, that is, German silver intended for re-melting and casting in sand moulds, it is sufficient to mix together the ingredients, fuse under a layer of charcoal, and pour into pig moulds ; sometimes a little tin is added, to give increased whiteness and hardness. It is in the casting of strips for the rolling mill that the special skill of the German silver maker comes in. Many a good brass caster has tried his hand at German silver strip casting and failed, although, to a superficial observer, the two operations are identical. Both alloys, when required in the form of sheets or wire, are cast into strips, or, in the case of wire, into rods, and these are then reduced to the finished form by mere mechanical manipulations. But a German silver strip, or wire rod, treated exactly as a brass one, would, in ninety-nine cases out of a hundred, result in a sheet or wire, good, perhaps, at one end, but unsound through half of its dimensions. The reason is to be found in the greater shrinkage of the nickel alloy during solidification, and the remedy for this is in the careful "feeding" of the ingot during cooling. To compound German silver, of whatever quality, certain weights of mixing and of brass, together with a smaller quantity of copper, are necessary; and to allow for loss of zinc by volatilisation during the melting, about 2 lbs. of spelter per heat for low qualities, and 1½ lbs. for the better qualities, are allowed, the heat being about 80 lbs. The ingredients are weighed out mixed with a certain quantity of scrap, and placed in the pot, which has been already heated to redness. The lumps of new metal are introduced with a pair of tongs, and the scrap by means of a long sheet-iron funnel reaching into the furnace. A few pieces of charcoal are now introduced, and the pot covered with a lid. When the charge has melted, the crucible is stirred with an iron rod, and the zinc allowed for waste is added, the pot being again stirred. Meanwhile the ingot moulds have been prepared and placed in position. The moulds are similar to those used for brass and are of two halves, clamped together by rings and wedges. The moulds are cleaned, rubbed inside with oil, and dusted with powdered charcoal (blacking). The caster raises the crucible from the furnace, and, holding it in position, pours the metal into the receptacle, while an assistant keeps back the floating pieces of charcoal with an iron rod. The mould is now full of German silver, and as the portion in contact with the cool surface solidifies, considerable shrinking takes place, and a hollow core begins to appear at the upper central part of the ingot. The skill of the workman is now brought to bear in supplying a fine stream of metal to prevent the formation of such a core. This stream is continued for some time, and the ingot is thus fed until the last portions form a projecting button at the centre of the upper extremity. Mixing, it may be mentioned, is always made in plumbago crucibles, the charge being diminished in each successive heat, to prevent the corrosive flux acting successively upon the same zone of the pot. German silver is melted in plumbago pots, or in the best fire-clay crucibles; the latter are, perhaps, better for the purpose, since they radiate heat with less rapidity, and remain hot for a longer time, a point of some importance when the pouring takes a considerable time, as in filling ingots for wire rods. If the ingots are intended for rolling into spoon strips, the nickel need not be of the very finest quality, because such strips are thick, and destined to undergo only a moderate amount of mechanical strain. Into metal of this kind a little inferior scrap, filings, &c., may be introduced; but, of course, it must not be supposed that any rubbish will answer the purposes of the spoon and fork manufacturer. German silver that is destined to undergo the trying operations of raising, deep stamping, or drafting, must be compounded of the best brands of spelter, such as "Upperbank," "D. & Co.," and of best selected copper; the nickel should be either grain nickel or the cake nickel made by the Nickel Company. A brand of nickel containing varying quantities of copper, imported from Sweden in the form of powder, also gives very good results. Only a limited quantity of the best "raising metal" scrap should be introduced; but this little, if good, has a tendency to improve the working properties, although the reason is not very evident. The ingots of raising metal are now planed on the flat faces, in order to remove the hard skin and the inequalities which would impair the surface of the finished sheets; spoon metal is usually not planed. When the metal reaches the rolling mill it is treated cold, in a similar manner to brass, the first operation being known as "breaking down." The ingots are passed diagonally between very powerful rolls, until they have attained to rather more than the breadth of the required sheet (to allow for trimming), and have, at the same time, of course, increased in length. This treatment is followed by passages longitudinally through smaller rolls. From time to time, and from the outset, the metal is annealed by heating it in a furnace and cooling with water; after each annealing the scale must be removed by pickling in dilute sulphuric acid, assisted by scouring with fine sand. Sometimes bright sheets are ordered, and when this is the case, the final pickling is done with aquafortis (nitric acid). The following table gives the composition of the various qualities of German silver; "holloware" or "raising metal," it will be noticed, contains proportionally less zinc and more copper than spoon metal or sand caster's pig. The mixtures of the various makers vary a little, some using more copper than others per unit of nickel; the former qualities are somewhat reddish, while the latter have a yellowish tinge.

TABLE I.—*G. S. as weighed out.*

	Lbs. per heat.			Percentages.		
	Copper.	Mixing. (1 & 1.)	Brass. (1 & 1.)	Copper.	Zinc.	Nickel.
"Best best"	8	34	27	55·79	19·56	24·64
"A," "holloware"	6⅝	33¼	26⅛	54·97	20·07	24·95
"A"	9⅝	27⅛	33¼	56·87	23·73	19·38
Special 1st (spoon)	10	29	30	57·23	21·73	21·01
1st spoon	11	24	30	58·46	23·08	18·46
1st holloware	18	24	21	64·28	16·66	19·05
2nd spoon	8	18	40	56·06	30·30	13·63
2nd holloware	15	18	29	62·10	23·38	14·51
3rd spoon & 3rd holloware	8	14	42	56·25	32·81	10·93
4th spoon & 4th holloware	8	12	48	55·88	35·30	8·82
5th spoon & holloware	10¾	8½	50	57·76	36·10	6·13
"Portland"	7½	6	54	55·58	39·98	4·44

TABLE II.—*As analysed. Results in per cent.*

Quality.	Copper.	Zinc.	Nickel.	Iron.	Lead.
Qual. spec. 4th	56·48	33·11	9·57	·39	·49
" " "	56·08	33·55	9·56	·39	·36
Sp. 1st. spoon	48·17	29·28	21·66	—	—
"B.B."	51·44	24·47	23·51	—	—
"B.B."	52·90	20·38	26·06	—	—
3rd	64·32	23·98	11·21	—	—
2nd "H."	63·34	22·64	13·58	—	—
"A 1"	54·70	20·25	23·67	·75	·26

New Books.

An important work, entitled "The Australasian Federal Directory of Commerce, Trades and Professions," has been in preparation some time, and will shortly be published in London under the direction of Mr. J. W. F. Rogers, of Melbourne and Sydney, at 57, Chancery Lane. The magnitude of this publication may be judged from the fact that it has been compiled by the assistance of some thousands of persons, many of them Colonial Government officials. The work will give, both in an alphabetic and a classified form, the business addresses for over three thousand Australasian towns, large and small. Reviews of the social and commercial development of the eight colonies of this group will appear in the Directory, with maps and gazetteer. As Australasia is one of our best customers, and imports from the United Kingdom over £30,000,000 in goods per annum, an Australasian Directory on so comprehensive a scale will no doubt be of much value to all interested in commercial and social intercourse with our progressive Southern Colonies. The work is, by express permission, under the patronage of the governors of all the Australasian Colonies, and will have the index of occupations in five languages, so as to give it a cosmopolitan utility.

The Metal Turner's Handybook.* By Paul N. Hasluck, A.I.M.E. This useful manual, just published, is one of a promised series by the same author, which, judging from the one before us, it will be our pleasant duty to notice as they appear. As the author remarks, there are thousands of turners (and their number, under the modern system of division of labour, is daily increasing) who have no idea of the infinite capacity of the machine they use. Those who have spent their career at some special work will probably excel in that particular branch, but if some branch of the art new to them is brought under their notice they are generally at a loss how to proceed. The book under notice is admirably calculated to supply this deficiency, dealing as it does in a small space with almost every kind of lathe and accessory in modern use, and the text is further made clear by over a hundred illustrations. The chapters treating of tool grinding, chucks and supplementary and miscellaneous items, are particularly interesting and instructive.

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* London: Crosby, Lockwood & Co., 7, Stationers' Hall Court, E.C. Price 2s.

Black Forest Clocks.

It is shown by reliable data, says Consul Ballow, of Kehl, in a recently-published report, that the manufacture of wooden ware, such as turners and coopers' articles, was carried on largely in the time of the Emperor Rodolphus of Hapsburg. Afterwards the making of tin spoons, brushes and other wares began. Towards the end of the 17th century, farmers, who were unable to maintain their families by the products of their farms, began to engage in clockmaking. Poor cottagers without property, but with inventive genius, and dependent upon the labour of their hands, were the first clockmakers, and their sons and apprentices introduced this industry into the districts where to-day it is a flourishing business. The case and movements of these clocks were made with tools of the very plainest description, such as a pair of compasses, a small scroll saw, augers and a knife. These wooden clocks proved to be a fortunate invention, as they found a ready sale and awakened the artistic talent of their inventors. In the middle of the last century clockmaking in the Black Forest was already carried on in all the localities where it now exists. The construction of a wooden clock with heavy weights was very plain. It consisted of three wheels only, a vertical swing-wheel put into motion, a balance resembling a yoke, to which were attached several leaden weights, in order to regulate the movement of the clock. This method of construction was, however, abandoned in 1740, and it was supplanted by the pendulum clock. At first the pendulum was placed before the dial; afterwards a longer pendulum was arranged behind the movement. All these clocks had to be wound up every 24 hours. Some of them were made to strike every quarter of an hour; clocks also were made with automatic figures, such as peasants or soldiers, that sounded a gong at the end of every hour, and also clocks that recorded the months and days as well as the hours. About the year 1750, movements made of wire were adopted, instead of wood, and afterwards metallic wheels were introduced. Since the year 1750, very neat, small clocks, with weights, called "Jockele-Uhren," after their inventor, Jacob Herbstreit, have been manufactured. At the beginning of this century, clockmaking had become a very important industry, and brought large profits to the manufacturers. From 1830 to 1850, however, this industry did not prosper, owing to the preservation of old shapes and the manufacture of clocks of inferior quality. With a view of stopping this decline, a technical school for clockmakers was founded at Furtwangen, the centre of the clock industry, in 1850, under the direction of M. Gerwig, who afterwards became one of the constructors of the St. Gothard Railway. Its purpose was to educate persons in the making of clocks, and also to introduce the manufacture of watches. The latter project had to be abandoned, owing to foreign competition, but in other respects the influence of the school was soon felt, for since that time the manufacture of clocks has greatly improved. After the expiration of twelve years, when its mission was considered to be accomplished, the school was dissolved, but professional schools have since been founded in the principal localities of the Black Forest, in order to give the necessary technical knowledge to apprentices. Prominent manufacturers also organise exhibitions, showing the condition of clockmaking, and the progress made therein. Although modern clocks, of a superior description, are principally made, there are still establishments which produce the traditional old-fashioned clocks, such as were made 150 years ago, with primitive wheels and plain wooden dials. Consul Ballow says that this is less due to the adherence of the Black Forest inhabitants to old tradition than to the fact that these clocks are in great demand, owing to their durability. At one period, the clockmaker made everything belonging to a wooden clock, but the rapidly increasing sales soon rendered a division of work necessary. Owing to the increasing demand, it became necessary to divide the various branches of the clock industry, but the latter still retained the character of a house industry, as the workmen are not employed in factories. They are usually small farmers, having a small extent of land and some cattle, and their spare time is devoted to making parts of clocks. The division of labour for a Black Forest clock is as follows:—The wood cutter, who prepares the wood of beech trees for the case; the case maker; the maker of the plate or shield; the painter; the founder of the bell and wheels; the chain maker; the spring maker; the carver; the dial maker; the decorator of the case; and, finally, the maker of the primitive movement. In the Black Forest there are, at present, 92 communities engaged in this industry, with 1,429 independent clockmakers, giving employment to 7,526 operatives. In 1796, the workshops turned out 75,000 clocks; in 1808, 200,000; and in 1880, the total production exceeded 1,800,000. In the city of Furtwangen alone, over 400,000 clocks were manufactured in 1880. Black Forest clocks are now exported to all parts of the globe. Every description, from the finest regulators to the plainest wooden clocks, are taken by Germany, while Austria only buys cheap articles, such as chain-work clocks, owing to the very heavy import duty with which clocks are burdened. Switzerland takes the trumpeter and cuckoo clocks for the use of foreigners, and drag-spring clocks for the native population. France bought no clocks for several years after the Franco-German war, but at present large quantities of the carved clocks called "Schottuhren" are exported to that country. Belgium and Holland require wooden clocks with bronzed frames. Russia imports a large number of carved regulators, also eight-day clocks in polished cases, for use on Russian farms. Spain and Portugal buy bronzed-framed carved clocks, with weights, and the United States take trumpeter and cuckoo clocks, with painted dials, also regulators and musical clocks.

Meetings of Societies, &c., for the Month.

Societies.	May.
Inventors' Institute, Lonsdale Chambers, Chancery Lane	2, 16
Photographic, 5a, Pall Mall East	10
Society of Arts, John Street, Adelphi	4, 11, 18, 25
Geological, Burlington House	11, 25
Numismatic, 22, Albemarle Street	19
Mathematical, 22, Albemarle Street	12
Royal Astronomical, Burlington House	13
Royal Meteorological, 30, Great George Street ...	18
Geologists' Association, University College	6
Royal Microscopical, King's College	11
Quekett Microscopical Club, University College ...	13, 27
British Archæological Association, 32, Sackville Street	*4, 18
Royal Archæological Institute, Oxford Mansion, Oxford Street, W.	5
Royal, Burlington House	5, 12, 26
Antiquaries, Burlington House...	5, 12, 26
Physical, Science Schools, South Kensington	14, 18

The Silver Question.—At a meeting of the Leicestershire Chamber of Agriculture on Saturday, the 16th ult., to discuss the currency question, Mr. Frewen, in the course of a long statement on the present causes of industrial depression, said that the perpetual shrinkage in prices had induced the belief that foreign competition, resulting from free imports, was at the bottom of our troubles; but it must not be lost sight of that prices have fallen and agricultural distress is nearly as general in the protected areas on the Continent and also in the United States. It was therefore necessary to discover some more universal cause for the present industrial crisis; and he believed that it was to be found in the serious contraction of the volume of legal tender money in the world, which had resulted from the efforts of western nations to make a single gold currency do all the work done previously to 1873 by the two precious metals in conjunction, which were before that date to all intents jointly legal tender. After referring to M. de Laveleye's figures to show that in eight years England had lost one-fifth of all her gold in currency, Mr. Frewen asked whether we were to sit still till the other four-fifths have been drained from us, or are we to admit silver to legal tender again, and to bring in that metal to support prices.

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* Anniversary Meeting at 4.30 p.m.

APPLICATIONS FOR LETTERS PATENT.

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

4,276. J. Howcroft, London, for "Improvements in scarf pins." Dated March 22, 1887.

4,286. J. Totton, Belfast, for "Trumpet, bugle or other such to be used as a brooch, breast-pin, earring, stud, or the like" (complete specification). Dated March 22, 1887.

4,316. E. Beaumé, London, for "Improvements in stem-winding and setting mechanism for watches." Dated March 22, 1887.

4,379. W. Snelgrove, London, for "An improved time-indicating candle lamp." Dated March 23, 1887.

4,516. M. Myers and E. Hunt, Birmingham, for "Improvements in hooks for holding watches and window tickets, and for other like purposes." Dated March 26, 1887.

4,658. W. G. Pilcher, Southsea, for "An artistic motto card for attaching finger rings to, for show cases and presentations." Dated March 29, 1887.

4,675. Oliver Imray, a commnnication from Waterbury Watch Company, United States, for "An improved construction of watch." Dated March 29, 1887.

4,739. I. Greenbury, Edinburgh, for "Improvements in bracelets." Dated March 30, 1887.

4,848. R. H. Padbury, London, for "An improved watch protector." Dated April 1, 1887.

4,913. A. Reynolds, Birmingham, for "Improvements in the construction of moveable studs." Dated April 2, 1887.

4,946. R. Haddan, a communication from T. A. Jackson, United States, for "Improvements in moulds for casting diamond tools" (complete specification). Dated April 2, 1887.

5,056. A. H. Potter, Chancery Lane, London, for "Improvements in watches" (complete specification). Dated April 5, 1887.

5,110. W. H. Douglas, Birmingham, for "Improvements in clock escapements." Dated April 6, 1887.

5,274. R. Rendell, a communication from A. B. Jones, United States, for "A new and improved electric clock." Dated April 12, 1887.

5,328. A. L. Parcelle, London, for "Improvements in electric and other clocks" (complete specification). Dated April 12, 1887.

5,499. J. Cook, Birmingham, for "Improvements in the fastenings of bracelets, which are also applicable to bags, waist-belts, clasps, gloves, scarf slides, cuff links and other such like articles." Dated April 15, 1887.

5,534. A. L. Parcelle, London, for "Improvements in electrical synchronons movements" (complete specification). Dated April 15, 1887.

5,544. F. R. Baker, Birmingham, for "Improvements in solitaires, sleeve links, cuff links, shirt studs, and other like dress fasteners and ornaments." Dated April 16, 1887.

Some Recent American Patents.

359,278. E. Parr, for "Musical box."
359,343. C. A. Burbank, for "Detachable watch pocket."
359,390. E. Hunziker, for "Fastening hair springs to collets."
359,528. E. Zoller, for "Cuff holder."
359,983. A. Runge, for "Alarm clock."
359,980. L. Murray, for "Manufacture of clock and watch balances."
359,830. R. C. Wittmann, for "Pneumatic clock."
359,799. C. A. Mayrhofer, for "Hydropneumatic clock system."

London Bankruptcy Court.

A MEETING was held on the 12th ult., before Mr. Stewart, Assistant Recorder, of the creditors of Messrs. Lund & Blockley, of 42, Pall Mall, and of Bombay, India, watch and chronometer makers, trading as "Lund, Blockley & Co." The receiving order was made in February, and the accounts, which refer only to the London firm, show gross liabilities £16,461 0s. 9d., of which £15,319 15s. 4d. is unsecured, and assets £8,732 16s. 8d. The failure is alleged to have arisen from loss on trading. Mr. H. D. Pritchard (Pritchard, Englefield & Co.) proposed a scheme of arrangement vesting the estate in Mr. R. Mackay, accountant, for distribution amongst the creditors, under the supervision of a committee of inspection, and, after some discussion, the scheme was agreed to. Mr. Munton (Munton & Morris) appeared for a creditor.

(In the Department of the Chief Official Receiver, *April* 14.)

Re William Henry Peake.

The receiving order was made against this debtor on February 24, he being described as of 29, Gerrard Street, Soho, manufacturing jeweller and diamond merchant, trading as Grant & Peake. The summary of the accounts, &c., has been issued to the creditors. The accounts show gross liabilities £123,485 2s. 8d., of which £89,371 17s. is unsecured, and assets £21,997 10s. 3d. From the observations it appears that the debtor joined Mr. Grant and Mr. Smith in partnership in 1867, and carried on business down to 1874, when Mr. Smith retired from the firm, which was continued down to 1875, when Mr. Grant retired, leaving in his capital, and being paid £2,000 as his share of the plant and goodwill and his capital at the rate of £4,000 per annum. No part of the principal had been paid, and Mr. Grant now appears as a creditor for £12,549 11s. 3d. The Official Receiver reports that the books are imperfect in many respects, and that the balance sheets made yearly were unreliable. In December, 1885, a surplus of £31,608 15s. 3d. was shown; but no account was taken at the time of liabilities £21,800, jewellery pledged £6,800, and book debts £24,100 odd, now considered to be irrecoverable. He attributes his failure to bad debts and liabilities on bills discounted. The security held by creditors fully secured is mainly jewellery pledged and deposited £26,218 14s., also freehold property and land. The first meeting is to be held on the 19th inst. at 11 o'clock.

Gazette.

Partnerships Dissolved.

S. Abrahams & Son, Houndsditch, City, jewellers. Ninnes Brothers, Tunbridge Wells, clockmakers. G. & A. Cornell, Tunbridge, watchmakers. F. Mordan & Co., City Road, gold pen makers, so far as regards J. J. Crosbie. James Vickers and Peter Roscoe, Bolton, pawnbrokers. J. Morrison & Co., Myddelton Street, Clerkenwell, manufacturing goldsmiths. L. Isaacs & Co., Clerkenwell Road, wholesale opticians.

THE BANKRUPTCY ACT, 1883.

Receiving Orders.

To surrender in London.—Miroy, Ernest, Queen Victoria Street, importer of clocks. Robinson, Frederick William, Fenchurch Street, watchmaker. Lazarus, Samuel, Hatton Garden, optician. Thomas, Sidney, Albemarle Street, Piccadilly, jeweller.

To surrender in the Country.—Jones, William Stewart, Bolton, watchmaker. Brown, Charles, Beccles, watchmaker. Hale, William, Cutmore, Sheffield, engraver. Hewitt, Alfred, Great Grimsby, watchmaker.

Amended Notice.

Brown, Charles, Bungay, watchmaker.

Public Examinations.

In London.—G. Lund & F. M. Blockley, Pall Mall and elsewhere, watchmakers; May 5, at 12. T. W. Harris, Brook Street, Hanover Square, jeweller, May 6, at 11.

Adjudications.

In London.—F. W. Robinson, Fenchurch Street, watchmaker. E. Miroy, Queen Victoria Street, importer of clocks. M. Rosenberg (trading as Oswald Rosenberg), St. Paul's Road, Canonbury, wholesale jeweller.

In the Country.—W. S. Jones, Bolton, watchmaker. C. Brown, Beccles, watchmaker. F. R. Linsham, Scarborough and Newark-on-Trent, watchmaker. W. C. Hale, Sheffield, engraver. T. Shaw, Birmingham, wholesale jeweller. A. Jack, Cheltenham, jeweller. A. Hewitt, Great Grimsby, watchmaker.

Amended Notice.

C. Brown, Bungay, watchmaker.

Notices of Dividends.

In London.—H. Hinks & D. Radcliffe, Vigo Street and Regent Street jewellers; 2s. 6d., first; any Monday; 7s. 6d., second; any Saturday A. J. Darling, 16, Brewer Street, Regent Street.

In the Country.—J. Meays, Wombwell and Darfield, pawnbroker; 5d., second and final; April 19, 17, Bank Street, Sheffield. A. J. Galli (separate estate), Leeds, jeweller; 5s. 6d., first and final; April 16, 1, Bond Street, Leeds. J. Gaunt, Barnsley, watchmaker; 5s. 7d., first and final; April 21, Official Receiver, Barnsley. T. White, Aberystwith, jeweller; 5¼d., second and final on old proofs, and 1s. 1½d., first and final on new proofs; April 27, Official Receiver, Carmarthen. W. H. Connold, Newcastle-on-Tyne, jeweller's assistant; 1s. 9d., fourth and final; April 27, Official Receiver, Newcastle-on-Tyne.

THE BANKRUPTCY ACT, 1869.

Declaration of Dividend.

A. Barker (separate estate), Birmingham, metal dealer; second dividend of 8s. 8d.; April 18, Official Receiver, Birmingham.

Correspondence.

All Letters for Publication to be addressed to the EDITOR *of* THE WATCHMAKER, JEWELLER AND SILVERSMITH. *Imperial Buildings, Ludgate Circus, E.C.*

All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.

TO THE EDITOR OF *The Watchmaker, Jeweller and Silversmith*.

SIR,—I beg to acquaint you that chronometer makers, desirous of sending chronometers to the forthcoming annual trial, must make application to the Hydrographer, Admiralty, Whitehall, S.W., not later than June 14. The last day for depositing chronometers here for trial will be Monday, June 27, 1887. Chronometers will be received on any day of the preceding week, between the hours of 10 and 1.

I am, SIR, your obedient servant,

W. H. M. CHRISTIE.

Royal Observatory, Greenwich,
April 26, 1887.

SIR,—Mr. J. D. Fisher, in a letter in your last number, takes exception to a paragraph which appeared in your issue for March, under the heading of "Watch Jobbing," which, he thinks, reflects on the moral character of "the retail watchmakers." These remarks were made in response to Mr. Fisher's request for the opinions of practical men as to the introduction into England of cheap keyless watches, and the substitution of Breguet for flat springs to common watches. In my opinion the practice of putting Breguet springs to very common watches is a bad one—and I believe most practical watchmakers would concur in that opinion—and I tried to account for its existence on what may be termed commercial principles.

Mr. Fisher objects to this, and seems to infer that the manufacturers are solely responsible by pointing out what is the duty as well as the interest of the shopkeeper. I do not think he has succeeded in doing this. My contention is that the introduction of these cheap keyless watches, the application of Breguet springs to worthless ones, and the Hall-marking of foreign-made watch cases are all parts of an unsound and dishonest system of trading; and although some of our foreign friends are very angry that the ugly word *fraud* should be used in connection with this subject, there can be no doubt that a good many very shady transactions do take place in the sale of watches, which are greatly assisted by these specious marks of superiority. Yet I cannot see that the manufacturer of these goods is altogether to blame in the matter: he would not take the trouble to complicate his manufactures if he did not find a better market for them by doing so; and however ignorant mere dealers may be of the merits of the work, they are very shrewd men and good judges of what will sell at a profit. It is quite clear, therefore, that if the retail watchmakers throughout the country can see with Mr. Fisher that their interest lies in selling a good, sound, honest article (apart from their duty of doing so), the remedy for the evil he complains of is entirely in their own hands.

X. O. N.

SIR,—Can you inform me what proportion of the watches sent to the Kew Observatory fail to obtain a Class A certificate? I take it few, if any, watches are sent in under Classes B and C, nor would any maker who had sent in for Class A accept a certificate of a lower grade. In the list of first twenty highest A certificates, published in your issue for February, I note eleven have been obtained by Swiss makers, and I suppose these are all Swiss watches. It would be interesting to know if any of the other nine watches were Swiss movements. The question after all occurs, what is the value of these certificates as tests of time-keeping *in the pocket?* These watches are placed and kept in certain positions for definite periods, and are not subject to the rough-and-tumble changing conditions of ordinary wear, and it is quite conceivable that a watch with a high-class A certificate might, in wear, contrast very unfavourably with a watch that would not pass in Class C. Watches, as a rule, are for use in the pocket. Are the Kew tests any measure of the probable performance of the watch in use?

I am, SIR, your obedient servant,

B. ARNOLD.

72, Baker Street, W., *April* 1, 1887.

[Our correspondent is wrong in most of his facts and inferences, and cannot have very carefully studied the report he refers to, as an examination of the first part (in which the proportions he asks for are given) will show. In the list of makers of the twenty watches gaining the highest number of marks at Kew during the past year, the names of only three Swiss occur, one of whom is an English watchmaker (in the accepted sense of the term) employing English labour. It is true the remaining firms (Messrs. Baume & Co. and Stauffer and Co.) take premier honours, inasmuch as nine out of the twenty watches are of their manufacture, but to refuse them all credit for so doing would be to display a spirit unworthy of English watchmaking. In these days of open competition "let him who has won it, bear the palm." As to the value of the certificates as tests of time-keeping: whatever timers' devices be resorted to, it is quite evident that none but a good watch can fulfil the requisite conditions for obtaining an A certificate; and we demur to the statement that "a watch with a high-class A certificate" could, under ordinary conditions of wear, "compare unfavourably with a watch that would not pass in Class C."—ED.]

Buyers' Guide.

The Sheffield Smelting Company, Sheffield, *Sell* Gold and Silver (pure and alloyed). *Buy* all materials containing Gold and Silver.

F. W. Powell (now Fowler & Powell), Colonial Buildings, Hatton Garden, E.C. Wholesale only for Gold and Silver Jewellery; Silver Cigar, Cigarette and Card Cases, Match Boxes, Salt Cellars; Silver and Glass Smelling Bottles; Sovereign Purses.

Jones, E. A., Wholesale Manufacturer of Whitby Jet Ornaments. A Large Assortment of the Newest Patterns always in Stock. Export Orders promptly executed. Persons not having an account open will avoid delay by forwarding a reference with their order. Customers' Matchings and Repairs with despatch. 93, Hatton Garden, London, E.C.

For cheap, quick, reliable Watch and Jewellery Repairs, by the most Experienced Workmen, send to ALEXANDER EDWARDS, Watch Material and Tool Dealer, 88 & 89, Craven Street, and 2, Holyhead Road, Coventry. Lists: all Horological Literature.

M. W. Skelton, Inventor and Manufacturer of Fusee Keyless and other Watches, Liverpool. Manufactory: 6, Park Place. New Wheels and Pinions. Conversions and Jobbing done in general for the trade. Country orders promptly attended to.

WANTED.

A VERY Experienced SPECIALIST MANUFACTURER seeks some GENUINE FACTORS for a NEW CHRONOGRAPH which defies all competition as to price, soundness and efficiency. The Chronograph acts as a simple chronograph, counter and fly-back. Offers to be addressed in writing to H. 730 Q, à Messrs. HAASENSTEIN & VOGLER, Bâle, Switzerland.—[ADVT.]

WATCHMAKERS AND JEWELLERS.—YOUNG MAN seeks SITUATION IN FRONT SHOP with a view to improvement. Indoors preferred. Willing to fill up time at bench.—D. T., Watchmaker, Diss.—[ADVT.]

TO BE SOLD.

WATCHMAKER'S and JEWELLER'S BUSINESS, established 17 years, in busy manufacturing city; stock moderate and will be reduced. Excellent opening for a young man starting business. For particulars, address *The Watchmaker, Jeweller and Silversmith* Office, London.—[ADVT.]

The Watchmaker, Jeweller and Silversmith.

Edited by D. GLASGOW, Jun.

Entered at Stationers' Hall.] [*Registered for Transmission Abroad.*

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CAUTION.

We beg to call attention to the notice respecting A. MAYNARD which appeared in our April issue, and again caution our readers against paying him money as a representative of this journal.

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The Watchmaker, Jeweller and Silversmith.

A Monthly Journal devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

Subscription.—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

Advertisements.—The rates for advertising will be sent on application. The Watchmaker, Jeweller and Silversmith will be found an exceptional medium for advertising. Special Notices, Situations, &c., per insertion, 1s. for two lines, prepaid.

Correspondence.—Correspondence is invited on all matters of interest to the trade. Correspondents will please give their full address in each communication, not necessarily for publication, but as a guarantee of good faith.

Address all business communications to

THE WATCHMAKER, JEWELLER & SILVERSMITH,
Imperial Buildings, Ludgate Circus, London, E.C.

Cheques and Postal Orders to be crossed and made payable to J. Truslove.

Agent for the Australian Colonies:
EVAN JONES,
Hunter Street and Royal Arcade, Sydney, N.S.W.

Editorial.

WITH the current number, the Twelfth Volume of *The Watchmaker, Jeweller and Silversmith*, being the first of the series inaugurated by the present regime, is concluded.

In the Editorial Notice in our issue of last July we briefly outlined the policy we should adopt in our future conduct of this journal; and the success attending our efforts so far, as shown by the large increase in our number of subscribers and the general good feeling manifested towards the journal by all with whom we have come in contact, is a very gratifying and flattering proof that the policy therein indicated has been the right one.

The condition of prosperity or otherwise of a trade journal is a very good index of the condition of the trade or trades represented by it. The conditions of modern business render it imperatively necessary for those who wish to succeed to inform themselves thoroughly as to what is going on around them, and the growing competition in every branch of trade necessitates the education in the broadest sense of those engaged in manufacturing.

As the selfish exclusiveness which obtained generally for so long in most branches of scientific and artistic production disappears, modern men of business are learning from experience that the shortsightedness which relies on so-called "trade secrets" does not pay, and that a coming forward and engaging in a mutual interchange of ideas is the true way to progress.

That a journal devoted to the interests of the trades it contemplates is the fittest medium for such an intercourse there can be no doubt, and it is at least probable that two of the three trades represented by us would have been greatly benefited had they possessed such an organ earlier.

Being of opinion that there is practically an unlimited field for the extension of this journal, we shall spare no efforts to improve it as opportunity offers, and, while thanking our subscribers and advertisers for the generous support hitherto accorded us, trust their future co-operation will enable us to still further merit their confidence.

THE calendar year which the present volume embraces has been one almost unprecedentedly full of doubts and difficulties among the trades represented by this journal, one of the outward and visible signs of which is to be seen in the numerous business failures it has been our painful office to chronicle during that period.

It was said by more than one prominent economist that the year 1886 was the third year of one of those intermittent periods of general trade depression for which it would be difficult to account, and that with its close we should see a renewal of business prosperity among all classes of traders. Like a good many other similar hortatory prophecies, however, this one has, unfortunately, not come true. Perhaps it was the knowledge of the coming Jubilee that inspired the political *vates* of 1886, or perhaps it is that the fancy trades have not yet felt the effect of a general business revival. But be the case as it may, there is little doubt, as far as our information goes, that the encouraging predictions of the past year have been so far only very partially borne out. The Jubilee seems to have fallen flat, and there is every reason to fear that the returns of the present year affecting the trades we are concerned with will not be greatly in excess of those of its predecessor.

Various reasons for an apparently unaccountable state of things are from time to time hazarded, perhaps the most frequent and strongly emphasised among them being that there is too much money in the country and that capitalists prefer safe investments, the current prices of Government stock being quoted in evidence. But that there are plenty of speculators willing to run risks for the sake of securing larger dividends is shown by the multitudinous new companies that are successfully floated, and the rushes for foreign stocks bearing a higher rate of interest; and if the capital that is thus invested is not diverted into the proper channels, from the British manufacturer's point of view, it is not altogether the fault of speculators, who in their ignorance of technicalities are led to believe in "something new" by means of specious advertisements and plausible prospectuses.

It may be argued that manufacturers are not in want of capital, and that the supply of goods already exceeds the demand. But it will be conceded that one of the most important functions of capital is to find a market and create a demand. Whatever may be the causes of the continued dulness of trade, it is allowable, and, under the circumstances, natural for those affected to theorise on the subject. What is mainly to be deplored is that most of the theories as to the causes of the present depression, as well as those advocated for securing a healthier state of things in the future, are evolved from a species of *a posteriori* reasoning based on hypothetical cases in which cause and effect are hopelessly mixed.

AN examination of the state of trade during the past twelve months brings us back again to the omnipresent and ever recurrent Merchandise Marks Bill.

Although the Bill deals with all classes of goods so far as fraudulent marking and misrepresentation are concerned, it is not our intention to make any remarks upon its general clauses, which will doubtless be fully considered before passing into law. But, as probably no further evidence will be taken with regard to the special clauses affecting watchmakers, a few additional words respecting them may not be out of place.

As we have already commented on the clauses above referred to, it is only necessary to emphasise summarily what we have previously said at greater length, and what we know to be the views of the most influential and impartial members of the trade, in the hope that, in the interests of English watchmaking, our remarks may reach those who are now dealing with the question.

Firstly, the English Hall-mark in the case—which we contend was never intended to apply to other than cases of British manufacture, and which is in itself merely a guarantee as to the quality of the gold or silver of which that case is composed—had undoubtedly, from usage, until lately, come to be looked upon by dealers as an indication of the place of origin of the whole watch, and as such it is still considered by a large proportion of the public both of this and other countries.

Under cover of this misunderstood warranty, various foreign makers have been enabled, with the assistance in many instances of English dealers, to place foreign imitations of English watches on the market to be sold as of English manufacture, to the great injury of the home trade. Whether these watches are better or worse than our own productions is beside the question.

Refuse then to give these foreign-made goods the accepted Government guarantee, in the shape of the Hall-mark, and the remedy is found, the common law being sufficient in cases of misrepresentation.

No doubt, so long as there is a greater margin of profit to be made by such transactions, foreign watches will continue to be sold as English by unscrupulous persons; but to introduce unworkable and retrograde legislation with the view of making individuals honest would be only to complicate matters and render the condition of the trade infinitely worse than it already is. The refusal to allow the English Hall-mark to foreign-made cases, while preventing the system of fraud above alluded to, would not debar English watchmakers from using them, should they think fit, as the Swiss and other countries with whom we are competing have official tests and marks quite as reliable as our own; while any such interference with free trade as that drafted out in the Bill as introduced, as it affects the movement or "works," would practically have the effect of handing over to the foreigner the entire trade in complicated watches, and creating monopolies by protecting those interested in the manufacture of movements. The idea of placing a mark indicative of its place of origin on a rough movement, which, even in a high-class watch, costs at the outside but a tithe of the value of the complete watch, is simply absurd; besides which, the said mark could, and probably would, be obliterated in the course of manufacture. The fact is, such legislation as that marked out in the original Bill, to which we have taken exception, is protection pure and simple, and, apart from its impracticability, is quite out of date.

THE registered offices of the London Chamber of Commerce (Incorporated) have been removed from 84-85, King William Street, E.C., to Botolph House, Eastcheap, E.C.

General Notes.

JULY 4 has been fixed by Her Majesty as the day for laying the foundation stone of the Imperial Institute. It is to be a high State occasion, and it is expected that all the mayoralties in the country will be represented. A third list of subscriptions has been published, which shows better than those which preceded it. Now, however, that the matter has been settled and the day fixed for the foundation ceremony, we may shortly expect to hear of a sensible addition having been made to the funds, and of subscriptions flowing in from all parts of the Empire. The committee announce that the smallest coin in the realm will be accepted and acknowledged. This is well, for it will enable the very poor to contribute their mites towards the erection of a building which is designed as much for their benefit as for that of the richest man in the land.

Mr. A. M. Silber (Messrs. Silber & Fleming) died on May 14, after a short illness. On June 24 last year he issued a circular announcing that "with the object of avoiding any interruption in the working of the business through sudden illness, death or otherwise," he had determined to register it as a private limited company. This was done, and the business will consequently be continued as heretofore.

We understand that arrangements have been completed under which the business of Elkington & Co., electro-platers and silversmiths, of Birmingham and London, has been converted into a company, under the title of Elkington & Co. (Limited). The shares are taken by the members of the firm of Elkington & Co., and it is not intended to make any allotment in favour of the public. The management of the business will be continued by some of the members of the late firm, who become directors of the company.

The United States, it is reported, have acceded to the terms of the Convention drawn up at Rome last year with regard to fraudulent marks. It will be remembered that Germany and the United States, among other countries, excluded themselves from the Convention. As a consequence, the American market has been flooded with German goods bearing English trade marks. In future the market of the United States will be closed against Germany and all other false-marking countries.

The Ruby Mines of Burmah.—A recent official telegram from Simla announces that the agreement between the Indian Government and Messrs. Streeter & Co., in regard to the ruby mines in Upper Burmah, is practically completed. Messrs. Streeter will pay to the Government four lakhs of rupees annually for five years, during which period they will have the monopoly of opening new mines in the ruby district, and improving existing ones. The rights and privileges of existing native owners are, however, strictly protected, Messrs. Streeter having the refusal of the rubies sold by them. It may be of interest to some of our readers to note that a lakh of rupees equals £10,000.

A great loss has been sustained by the firm of Messrs. Wheatley Brothers, of Sheffield, the well-known cutlery manufacturers, by the death of Mr. S. Villiers Wheatley, which took place at Glasgow about three weeks ago. The cause of death was congestion of the lungs. The deceased gentleman was 47 years of age, and was senior member of the firm.

Messrs. Ralph Heaton & Sons, of Birmingham, have just been entrusted by the Chinese Government with a contract for the supply of machinery for producing a new Chinese coinage. This contract, which is the largest of the kind that has ever been placed, is to supply, within a year from date, 90 coining presses and all the necessary machinery for fitting up a mint in China. The extent of this order may be estimated from the fact that there are only sixteen presses in the Royal Mint in London.

The patent collapsible drinking cup of Messrs. C. Timings and Son, of 85, Spencer Street, Birmingham, which we noticed in our December issue, has been, as we predicted, well received by the public, and the patentee has now found it necessary to issue a caution to the trade against the spurious imitations its successful sale has called forth, and to draw attention to the patent number, 15,061, and initials, E. J. T., which distinguish the genuine article.

East London Industrial Exhibition.—The Goldsmiths' Co. has made a grant of £50 towards the expenses of the East London Industries Exhibition, which was opened by the Countess of Rosebery on the 24th ult.

The French Exhibition of 1889.—Her Majesty's Government have declined England's official participation in the proposed Exhibition to be held in Paris in the summer of 1889, to commemorate the capture of the Bastile and the triumph of the French Revolution. Every possible facility will, however, be accorded to British exhibitors desirous of taking part in the Exhibition.

Glasgow Exhibition.—The Lord Provost of Glasgow, before a large crowd on Monday, the 2nd ult., cut the first sod of the International Exhibition, which will be opened next year. It has just been notified that the Prince of Wales has consented to become honorary president, and that committees have been appointed in India to promote the Exhibition, which will be the grandest ever seen in Scotland. His lordship, in the course of his remarks on the occasion, hoped that the Exhibition would result in the founding of a splendid technical college.

This seems to be a year of exhibitions, the following among others having been formally opened during the past month:—Saltaire, on the 6th; Havre (Maritime), on the 7th; the American, London, on the 9th; Newcastle-on-Tyne (Mining, Engineering and Industrial), on the 11th; Liverpool (Jubilee), on the 16th; the East London (Industrial), on the 24th; the Manchester, a short notice of which we give on another page, on the 3rd.

Barcelona Exhibition.—Mr. U. Montejo, the Spanish Consul-General, in recommending this Exhibition, which is to be opened on September 15 next, to the notice of British manufacturers, calls attention to the special importance that attaches to it as being the first Exhibition which will have been held in Spain since the conclusion of the new commercial treaty between that country and England. The official agents for the Exhibition in this country are Messrs. Jardine & Norway, of 17, Great George Street, Westminster, and 18, Lord Street, Liverpool.

Reporting on the trade and industry of Barcelona during the year 1886, Consul Wooldridge writes:—"Notwithstanding the admission of English goods to the most favoured nation clause in all treaties between Spain and European nations, competition is still severe, and to succeed England must produce goods as good and cheaper than she does now. In Barcelona the shops display so-called English wares, which are imported from Germany and Belgium, so that superior English goods cannot be sold for the prices asked. At present there does not appear to be any new trade carried on with success; the standing trade meets all the present necessities of the place, and all that is required is to attempt competition with the present foreign local trade in those articles mentioned in the tariff which are British productions, by the superiority of work, and by the better quality and cheapness of similar goods of Continental make. The Catalan purchaser would prefer to give five shillings for two German pocket-knives of inferior make than the same price for an English one, which will be of superior material and finish, but to all appearance similar: thus he gets two knives for one. It is even said that dry goods manufactured in Barcelona are actually exported to England and re-imported with British marks and labels."

Proposed German Exhibition.—According to *Kühlow's Trade Review* an Exhibition on a large scale has been proposed for Hamburg for the year 1889. The show will not only include all the productions of the specific Hamburg industries, but also the German commodities exported through that port, and the raw stuffs imported by German inland manufacturers. The Exhibition is organised chiefly in view of important alterations in the Customs arrangements which Hamburg people have been trying to bring about for some time, and the completion of which is now a matter of only a few weeks.

The Brussels correspondent of *Industries* states that at Bruges a trade guild has been formed on the same lines as those existing in Flanders in the Middle Ages. All trades, both workmen and masters, are admitted. The objects of the society is mutual assistance, and to counteract socialism.

The Sale of the French Crown Jewels.—The sale of the French Crown Jewels, which began on the 12th ult., was brought to a close on the 23rd, the total amount realised being 6,864,000 fcs. The proportion of foreign buyers present throughout the sales was greater than that of French jewellers, and, as we predicted last month, a considerable quantity of the gems went to American bidders. Although the amount realised by the sale was even greater than was expected, the general character and quality of the larger stones is said by English merchants to have been extremely disappointing. It is even averred that in some of the lots larger and heavier stones were substituted for the historical originals.

Sir B. Samuelson has obtained leave to introduce the following Bills into the House:—Bill for the Registration of Firms and of persons carrying on business under names or styles other than their own; a Bill to Establish Limited Partnerships; and a Bill to Consolidate and Amend the Law of Partnerships.

We have received a copy of Messrs. Walker & Hall's (of Sheffield) new illustrated catalogue of their silver, electro-plate and cutlery ware. It is fully illustrated, the designs embracing some of the newest patterns we have seen; and, as the catalogue is very complete, and every particular as to price, &c., is given, it should be at once applied for by purchasers, to whom it should prove of great assistance.

The largest pawnbroking business which has been disposed of for several years was sold on April 29, by Messrs. Debenham, Storr & Sons, at King Street, Covent Garden, in the presence of numerous leading members of the London trade. This was the business of the late Mr. R. Attenborough, whose death excited such a painful sensation some time back. The premises, which are situated in the best part of Oxford Street, are held on a lease having an unexpired term of fourteen years to run, at a present rental of £180 per annum, to be increased to £200 in October, 1892. The purchaser of the lease had the option of taking the pledge and contract stocks, amounting to £15,000 (of which £13,000 were plate, watches and jewellery) at a premium of 10 per cent. on the sums advanced; also the sale stock, the cost price of which exceeded £5,000, at valuation, which was estimated to reduce it to £3,500. The shop and trade fixtures had been valued at £534, and these were to be taken by the purchaser of the lease at that price. The auctioneer having stated his opinion that the lease would be cheap at £3,000, the bidding was started by an offer of £1,000, from which it rose by advances of £50 to £3,750, when Mr. Jay, of Essex Road, bid £4,000. After a spirited competition, Mr. Jay was declared the buyer at £5,000. This gentleman then announced his intention of exercising the option of taking Lot 2—the pledge and sale stocks—on the terms before stated. The total amount involved in the purchase is £24,000.

Messrs. F. Silvester & Co., of the Castle Hill Works, Newcastle, Staffordshire, have just shipped a large consignment of mining machinery to Australia, and are now engaged on similar work for India.

The Astronomical Congress, at its sitting in Paris on April 23, adopted the conclusions of its committees relative to the methods to be employed to obtain a photographic chart of the heavens. The photographic apparatus to be employed is that already used with success by M. Bouquet de la Grye. The important question of the co-operation of the various observatories in this work was also discussed. For France, the four observatories which are to participate in it are those of Paris, Bordeaux, Toulouse and Algiers. The foreign astronomers were asked whether they could give any indications relative to the participation of their Governments in the enterprise, and most of them replied in the affirmative. The cost of making the photographic instruments will amount to more than 40,000 fcs.

Recent advices from the Midlands state that better orders for edge tools, machinery and general goods are coming in from India, Burmah and China, as well as from South America, although the markets in some parts of the last are still adversely affected by the cholera and the stringency of the quarantine regulations. Business with the South African Diamond Fields is tolerably active in implements, water tubes, machinery and hollow-ware. Spain is taking considerable quantities of machinery tools, stamped brass goods, hoop iron, &c., and there is a fair amount of business stirring with France, Germany and Holland. The brass trades of Birmingham are slowly recovering, but the movement is mainly confined to goods of the cheaper descriptions.

While the numerous reports from our Consuls in various quarters of the globe testify to the vigilance recent Governmental orders has awakened among them, there are not wanting signs that our rivals are equally active. The French Consul at the Cape, in a recent communication, says that the import of machinery for the extraction of gold, which, in accordance with the terms of the new tariff, is to be admitted into the Colony free, is increasing almost daily to a considerable extent. "I would again," he writes, "call the attention of French traders in this branch of industry to the advantages which will assuredly accrue to their English rivals in the supply of this machinery. French traders should make an effort to dispute this monopoly. I am convinced that during the rainy season transports could be easily made by way of Delagoa Bay to Barberton and Uitwatersrand, and by this means trade secured which might otherwise get into the hands of our rivals. An agent should be sent by some syndicate to study the question on the spot."

The Diamond Market.—A slight forward movement has been going on at *Amsterdam* and *Antwerp*, small stuffs being in greatest demand. Prices remain unfavourable to sellers, *rough* especially being dear. At the beginning of the month it was feared that the scarcity of the rough stones would throw a number of polishers and cutters out of work, but a slight improvement has since taken place and the manufactories are now fully going.

The sale of the French Crown Jewels has naturally affected the *Paris* general trade, the many foreign buyers present having mainly attended for the purpose of either witnessing or partaking in the sale, and little business has in consequence been transacted. The high prices realised at the sale are, however, looked upon as a favourable indication of a growing public appreciation of precious stones, and better times are anticipated.

The steamers "Garth Castle," "Moor," "Roslin Castle" and "Athenian" arrived at Plymouth during the month, bringing a plentiful supply from the fields. Numerous foreign buyers were present.

From *Kimberley*, the latest advices state that the market is very firm, a strong demand being shown for fresh goods; coloured stones are, however, at a discount.

Silver.—The market underwent the usual slight fluctuations during the month, advancing and declining according to the Indian exchanges. Bars are now quoted at 43½d. per oz.

The Manchester Exhibition.

THE Manchester Exhibition was opened on Tuesday, May 3, by the Prince of Wales, His Royal Highness being accompanied by the Princess. The Exhibition building is a fine edifice having a handsome exterior; it is in the form of a Latin cross, over the centre of which towers an immense dome of nearly 150 feet in height. At each end of the central nave rise graceful towers, flanking two quadrangular pavilions. The grouping of dome, pavilions and towers, as seen from a little distance, is most effective, and makes an admirable sky-line; while the picturesque situation, with the fine trees of the Botanical Gardens as a background, enhances the pleasing aspect of the whole Exhibition. There are two annexes to the main building in which the machinery is placed, and the total area covered by the Exhibition, inclusive of the Botanical Gardens, is 43 acres, that of the buildings alone occupying eleven acres. The space devoted to machinery is 135,000 square feet, which is half as much again as was given for the same purpose to the exhibitions last year at London, Edinburgh and Liverpool put together.

The following are the departments into which the Exhibition is divided:—Industrial Design; Silk Industry, Machinery, &c.; Chemical and allied Industries; Photography; Handicrafts in Operation, Music, Electric Lighting, Horticulture, &c.; Irish Section and Fine Arts.

Among the exhibits most interesting to our readers, the first which strikes us is that of Messrs. Elkington & Co., who have been favoured by the committee with a conspicuous place in the Exhibition; and this is fully justified by a remarkably beautiful display of *objets d'art* in the precious metals, and also in articles of a more useful kind. The position of the case is immediately facing the great dome, opposite the gallery leading to the machinery annexe, and adjacent to the gallery of approach. Several of the articles shown have already been exhibited in the Royal Academy, and some have been submitted to the Queen for Her Majesty's inspection and approval. One of the principal objects displayed is the shield illustrating passages from "The Pilgrim's Progress." In the centre is a spirited representation of the combat between Christian and Apollyon, the subjects of the surrounding panels representing various episodes in the work. The border is of iron, most beautifully and richly damascened with gold. The value of this shield is £1,500. There are also two fine racing cups—the Goodwood Cup of 1881 and the Croydon Cup—as well as two beautiful equestrian statuettes, modelled in oxydised silver, and rich in chasing and gold. All that art can possibly do seems to have been expended on the various plaques, shields, punch bowls, candelabra and other articles to grace the tables of the wealthy. Beautiful vases, modelled by artists of the highest rank, and cunningly decorated with wonderful life-like figures, richly damascened in silver and gold, are here in profusion. One vase in particular is a gem of its kind. It was designed and wrought by the artist's own hand. The decoration is graceful and true to nature. Although this vase stands only about 20 inches high it is valued at no less than £650. Two plaques, also by the same master-hand, represents scenes from "Much Ado About Nothing" and "The Merchant of Venice." These are valued at £1,000 each. Various other plaques and tazzas represent "Perseus and Andromeda," "Cupid and Phryne," "Melpomene," "St. George and the Dragon," "Truth and Fable," "Psyche," and other subjects. A fine reproduction is a grand cup from Nuremberg, standing nearly 4 feet high. This is a splendid example of mediæval work. Other reproductions include silver gilt salver, from the Popta Hospital at Marssum, Dutch work, 16th century; also silver ewer and a pair of candlesticks of the same period; a grand tankard covered with Danish coins; a ewer from the Winter Palace of St. Petersburg, forming part of a toilet service made for the Empress Manova in 1730; a flagon from the treasury of the Patriarch, Moscow, date 1610; a very fine cup and cover, from the Kremlin, Moscow, 17th century work, and a grand silver gilt salver, also from the Kremlin, chased with a variety of ornaments, set with six placques of ivory, and jewelled with rubies; a remarkable flask stopper and chain, inscribed in Sclavonic, sent to the Czar Alexis Michailovich by the King of England, Charles II., in 1664; a fine dish, ornamented with rich chasing, the centre containing a bold bas relief, "Venus Navigating the Sea," and which formed one of the prizes given by the Queen at Wimbledon; the Milton Shield, the original of which was purchased by the Government for £3,000, now in South Kensington Museum; twelve 16th century plates, representing the labours of Hercules; also the "Toilet of a Pompeian Lady," one of the most charming placques ever modelled. Messrs. Elkington & Co. are the only manufacturers of cloisonne enamels in this country. A few fine specimens are here shown, notably a pair of tall cylindrical vases, which are valued at 100 guineas, and a few choice smaller ones. The silver dessert service of the Queen Anne period is worthy of attention: it is valued at £800. The display of useful articles is very good, and includes a beautiful tea and coffee service of the Gothic period; a richly chased and gilt dessert service, "Bacchanalian;" also the Satyr service, most exquisitely modelled; and a variety of cruet frames, candelabra, waiter, &c. Elkington's art gold bronze must also not be forgotten. This is the most recent production in metals, suited to the art worker's craft.

Stand 1,138, Handicraft Section, is occupied by Messrs. W. Scott, Hayward & Co., jet ornament manufacturers and jet cameo cutters, 59, Deansgate, and Barton Arcade, Manchester, who also have branches at Liverpool, Leipzig, Paris, and works at Whitby. They show some very fine ornaments made entirely of jet. Our attention was particularly called to an exquisite little casket, which in open competition gained the Silver Medal presented by the Worshipful Company of Turners, London, and the Freedom of the City of London, 1885; also a vase which in 1873 gained a similar prize: the above being the highest awards ever obtained for a jet exhibit. We noticed a number of other elegant ornaments, but have not room to comment upon them. The manufacture of jet jewellery is very interesting, and is fully illustrated at this stand, which has workshops at either end, fitted up with two lathes and ten wheels, the latter being named as follows:—Grindstone, canting stone, listing board, wood board, rouge board, cutting mill, lead mill, shag board, rough brush, polishing brush—all which, we are informed, are required in the manufacture of the above jewellery. The cameo cutting and the carving of flowers are all done with a small knife of a most primitive style; in fact, it struck us that the whole plant was of a very primitive nature, all the wheels being worked by foot treadles, which the workmen say they prefer to steam power. Specimens of every kind of jet can be seen here, which are known to the trade as hard English blue and yellow skin; these are the most valuable, and when found in good size and clean pieces fetch as much as 18s. per lb. Soft English jet is only used to make common articles, as it is very liable to crack. Different varieties of Spanish jet are also shown, which are extensively used for common beads, brooches, bracelets, &c. If of the best quality it is worth 21s. a stone. It is in no way equal to the English jet for fine work or for carvings, and is not used in the manufacture of the best articles.

On the right from the Chester Road entrance is the stand of Messrs. Procter & Co., London. Their display comprises, among other exhibits, specimens of Indian work in gold, silver, copper and iron, &c., and a diamond which in itself is almost worth a visit to the Exhibition.

One of the most interesting stands is that of Mr. S. Learoyd, of Huddersfield (No. 221). It is situated on the right going towards the organ from the central dome, and contains specimens of almost every description of precious stone, cut and in the rough; also a series of 24 models of the large historical and other diamonds, among which are the Stewart (288 carats), the Great Nizam (440 carats), the Star of the South (254 carats) and many others.

Messrs. Chatwood & Co. have a good display of strong rooms and burglar-proof and fire-proof safes.

Messrs. J. H. Andrew & Co., Toledo Steel Works, Sheffield, show a variety of files, hammers, springs, &c., suitable for all kinds of work.

Clockmaking is represented by Messrs. Batty & Son, of Market Street, Manchester, and Lord Street, Southport, with round eight-day timepieces throughout the buildings, and an eight-day "Grandfather" striking clock fitted with Harrington's patent tube chimes.

Messrs. Walker & Hall, Electro Works, Sheffield (No. 28, Section I.), show sterling silver ware, electro-plate and table cutlery.

Messrs. Thomas Armstrong & Bros., 88 & 90, Deansgate, Manchester, have a fine display of clocks, watches, gold chains and jewellery, spectacles and eye glasses, cases of test glasses, ophthalmoscopes and test types for oculists, race, field and opera glasses, barometers, surveying instruments, all kinds of telescopes, photographic apparatus, &c., &c. This exhibit is one of the most varied and interesting in the Exhibition.

Mr. J. J. Royle, 27 & 29, King Street West, Manchester; 13, Red Lion Square, London; and 57, Hope Street, Glasgow, has, at Stand 135 in this Section, a varied assortment of electro-plate and other ware, &c., containing, among other novelties, goods for various purposes, showing the application of Royle's patent self-pouring system, well worth inspection.

Messrs. Joseph Rodgers & Son, Limited, 6, Norfolk Street, Sheffield (No. 176), have a high-class display of table cutlery and electro-plated goods well worthy of the character of the firm.

Chubb's Lock & Safe Co., Limited, London and Manchester, show Chubb's patent diamond safe, containing diamonds exhibited by Messrs. John Hall & Co., of King Street, Manchester, and constructed of hardened drill-proof steel, with sliding doors and steel cage over the opening. By an ingenious arrangement the doors are drawn back and the glass containing the jewels is at the same time moved up so as to be exposed to view outside the safe. This safe and its cage is a precise reproduction of one made by the same firm to contain the celebrated Koh-i-noor diamond, which was exhibited by the Queen at the first great International Exhibition of 1851.

Some other stands in this Section worth a visit are—

Messrs. John Mallett & Son, 36, Milsom Street, Bath (No. 284).—Indian, Chinese and Japanese gold and silver; jewelled and bronze plate jewellery and curios; enamels, ivories, &c.

Mr. Peter Hertz, Copenhagen, Denmark (No. 285).—Gold and silver manufacturing in modern and ancient fashions; the Oldenborgian drinking horn; copy from the chronological collection from the Danish kings on the castle of Rosenborg.

Messrs. Benton & Johnson, 63, King's Cross Road, London, W.C. (No. 286).—Gold and silver wires, threads, bullions, braids and cords; gold leaf; gold and silver imitation threads, wires, bullions, fringes, braids and cords.

Messrs. Ollivant & Botsford, 2, Exchange Street, Manchester (No. 287).—Silver plate, jewellery, watches, chime clocks.

Messrs. John Hall & Co., 56, King Street, Manchester (No. 288).—English-made watches and clocks; manufactured silver and electro-plate; gem jewellery, with models of the principal historic diamonds of the world.

Mr. J. L. Jazowski, International House, 112, Bold Street, Liverpool (No. 289).—Real amber jewellery; meerschaum pipes and cigar holders; silver jewellery; electro-plated articles; English and Continental goods.

In Section II., which is devoted to machinery—

Messrs. Ralph Heaton & Sons, The Mint, Birmingham (No. 379) show cold wrought seamless copper tubes, brass and copper tubes (plain and ornamental), rolled metals, wire, gasfittings, water fittings, bedstead fittings, spun work, stamped ornaments, coins, checks, medals, blanks, &c.; coining press in motion striking medals.

Messrs. Tangyes, Limited, Birmingham and Manchester (No. 413).—Exhibits in motion: Tangyes' vertical engine, 8 in. diameter cylinder with dynamo; horizontal engine, Belfast type, cylinder 12 in. diameter by 24 in. stroke, with Jefferiss' patent automatic expansion gear; horizontal engine, Tangye type, cylinder 8 in. diameter by 16 in. stroke, with Tangye & Johnson's patent expansion gear; high-speed engine, Floyd's patent, cylinder 4 in. diameter; 8-in. centrifugal pumping engine; special direct-acting steam pump, steam cylinder 12 in. diameter, water cylinder 8 in. diameter by 24 in. stroke; Colonial ram pump, steam cylinders 8 in. diameter, rams 4 in. diameter; Tangyes' gas hammer, Robson's patent, $\frac{3}{4}$ cwt. size; three-spindle lathe; Cherry's patent hydraulic hoist (model); 3-ton overhead traveller, Cherry's patent. Exhibits not in motion: Tangyes' centrifugal pumps, 2 in. and 12 in. diameter; self-acting sliding and screw-cutting lathe, Pendlebury's patent, 8 in. centres; wheel-cutting machine, to cut up to 18 in. diameter; 40-cwt. D.P. hoisting crab; 20-cwt. S.P. hoisting crab; assortment of hydraulic jacks, screw jacks, hydraulic bears, screw bears, Weston's pulley blocks (with Tangyes' patent guides), Cherry's brake blocks and rope blocks; strainer-plate for paper makers.

The large number of motors and dynamos for use in electro-deposition affords an interesting and instructive study and shows the importance to which the branch of science has of late years attained.

Group VIII., Section III., is made up of a series of metallurgical exhibits, an enumeration of which would take more space than we have at our disposal.

Of the remaining exhibits of interest to our readers those of Messrs. Lloyd, Payne & Amiel, Thomas Street, Manchester; C. Joseph & Co., 277, Pentonville Road, London; and H. Samuel, Market Street, Manchester, all situated in the Old Manchester Street, showing clocks, watches and jewellery, are well worth attention.

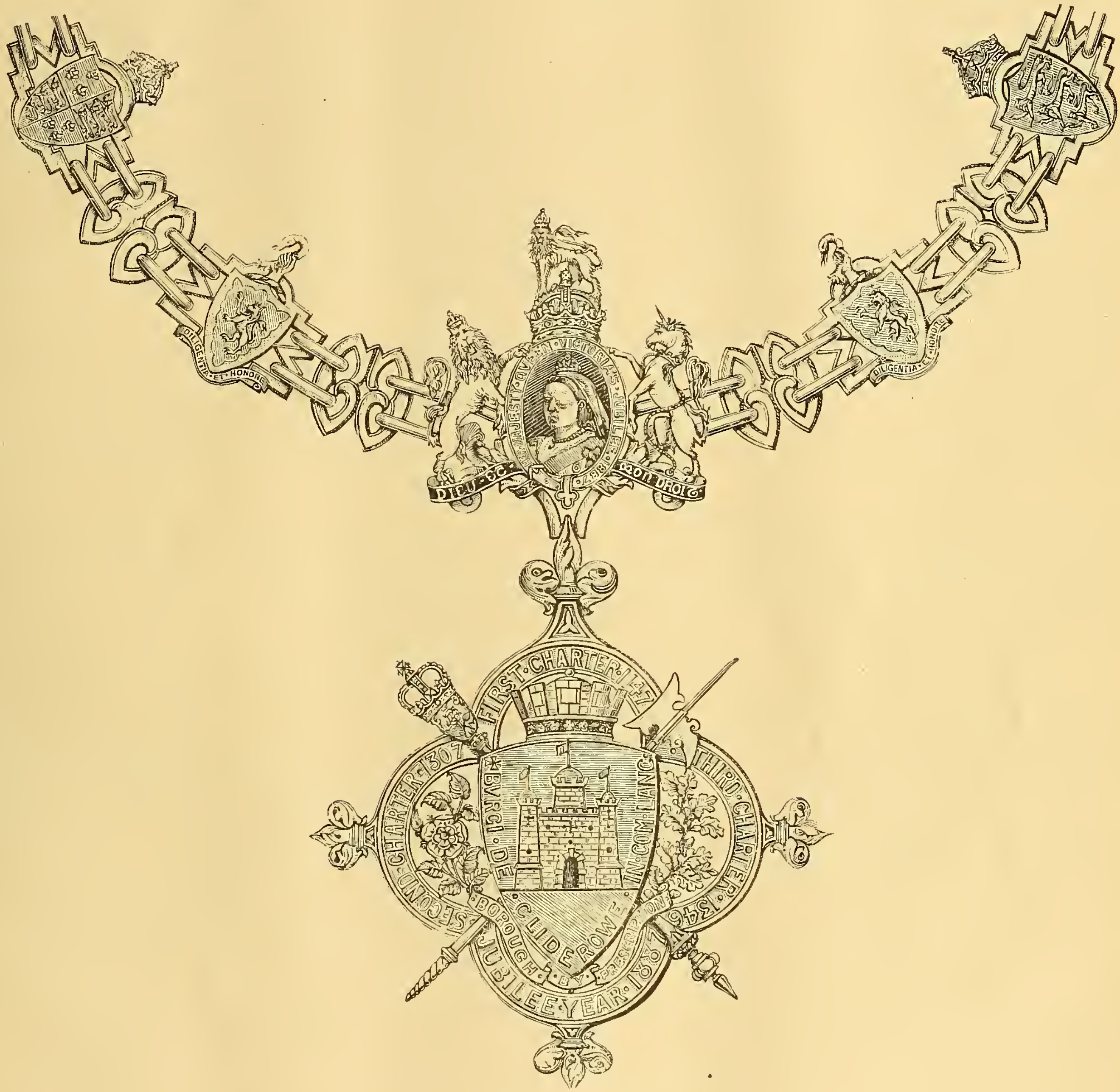
Birmingham News.

From Our Correspondent.

THE brooch trade, which has been an important branch of the jeweller's business for some years, is said to have fallen off lately until it has become very insignificant—and one of our largest makers expresses his regret that such is the case. I think the cause of this is obvious, the growing fashion among ladies, and even working girls, of wearing a bunch of flowers during the spring and summer months, must, I think, explain the why and wherefore: at any rate, if it is as popular in other towns as it is in Birmingham; for there is no doubt that the florists here are taking largely of the money that was formerly spent in jewellery, and one of our florists here tells me that he uses 1 cwt. of wire per week for tying up "button-holes" only. How soon the fashion will alter it is difficult to prophesy; for although the ladies are fond of a change of fashion, yet flowers, with their charming and delicate colours, are loved by all, and especially by the fair sex, so that it is probable they may be favourites for some time, to the partial exclusion of brooches. But I would suggest to the makers that a brooch which could be used to attach a bunch of flowers to the dress would certainly prove saleable; and although there have been some attempts to put an article of this kind on the market, yet they have been few and far between, and the ornaments for the most part too expensive. I feel sure there is still a good opening for an enterprising firm who can produce something new and at a popular price. In the meantime the makers are no doubt suffering—there is an instance here this week of a manufacturer filing his petition in bankruptcy, with liabilities about £2,000 and assets not showing many pence in the £—the chief sufferers being stone dealers, die sinkers and out-workers, the two last especially being a class of workers who can very ill afford the loss, as it is all labour that makes up the total.

The opticians, both in gold and steel, report a fair amount of business being done; but prices are low and profits very small, owing to the increasing competition both at home and abroad. I also hear of some good lines being done in compass charms, watch keys, and, in some instances, in gold chains, but the chain trade generally is very bad.

The athletic world is finding a good number of orders for the medallists, the new badge of the Cyclists' Touring Club being foremost just now, one maker here having booked orders lately for twenty gross at a time of the Club's registered design in silver; and as the Club boasts of over 20,000 members, the majority of whom wear the badge, there are still some orders to be placed.



Mayoral Chain for Clitheroe.

There is still a fair demand for solitaires of various kinds, principally patent spring arrangements, and of the cheap qualities such as can be sold by drapers and haberdashers, and I suppose this will continue so long as cuffs are the fashion: when they go out bracelets will come in again, and then another branch of the trade will have a turn.

* * *

The steel toy makers are suffering from the German competition in such goods as gents' alberts and ladies' ornaments. Some of the importers are quoting as low as 3s. 6d. per gross for alberts this week, and they are wonderful value. A stock of them I was allowed to see, by the kindness of the buyer, were very pretty and nicely finished goods; as a rule German jewellery does not compete with English at all for quality and wear, but in this case no doubt they are practically as good as English make.

The premises of Mr. W. N. Haseler, Richard Street, Birmingham, one of our oldest jewellery manufacturers, were burnt down on Sunday morning, May 15; there is no clue to the cause of the catastrophe, and although the building and fixtures, stock, &c., are insured, yet there are a large number of valuable patterns, dies and tools destroyed, which money cannot replace, and the actual loss will be about £500; the stock was saved, the fire being confined to the shopping and rough warehouse.

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By the courtesy of Messrs. T. & J. Bragg, I have been able to forward an illustration of the Clitheroe Mayoral Chain, a description of which was given in the March number of the journal.

American Items.

A PETITION is being prepared by the retail jewellers of Canada for presentation to the Dominion Legislature, asking that the duty on watch movements be reduced from twenty to ten per cent. The petition urges that, inasmuch as no movements are manufactured in Canada, nor are likely to be, the high duty is unnecessary.

THE *Jewelers' Weekly* says that the reason alleged by the Canadian Customs authorities for the imposition of a duty upon American watches and jewellery, as reported in the last issue of the *Weekly*, has been regarded as a transparent subterfuge for the actual motive. While it is one of the first and most vital principles of political economy that the object of a customs tax is to protect home industry from outside competition, neither Great Britain nor the Dominion has hitherto acknowledged (whatever they may have felt) the necessity for the adoption of a policy of this nature. The present attitude, in immediate succession to the recent difficulty between the two countries, savours more of retaliation than protection, and it is feared will work greater inconvenience than benefit to the country adopting it.

THE Montreal firm of I. Joseph & Son is not affected by the heavy failure of the Birmingham house bearing the same name, the former having severed their connection with the latter some time since.

WORD comes from Ottawa of the discovery of rich gold deposits in British Columbia, close to the imaginary boundary line between that province and Alaska, which may lead to serious trouble if the actual boundary is not defined before any attempt is made to develop these valuable finds. In view of the discovery of gold in the Pacific provinces, the Dominion Government have decided on sending out a party to make a geological survey of that part of the country. An effort will be made in the coming session of Parliament to secure an appropriation to begin a survey of the British Columbian boundary, in the hope that the United States Government will co-operate and definitely fix the boundary line, and thus remove all possibility of disputes.

NEW YORK diamond experts were in great request during the latter part of last month, to solve the question whether a large stone, as large as a hen's egg, was a diamond or not. It is a peculiar stone, found in one of the Western States, and sent there to be disposed of. Its surface is rough and resembles an ordinary pebble in appearance. The shape is somewhat irregular, and in one end is a large interior flaw, distinctly visible, which shows colours when exposed in the light. The stone originally weighed over 900 carats, but a small portion has been cut off. The lapidary who cut it found the material very hard and spoiled a whole set of tools on it. He succeeded in producing a small stone, gem shaped, miserably polished, without any life or brilliancy. This stone has been examined by experts, who have given vague opinions as to its character. Some say it is a topaz, others a white sapphire, while the owners believe it to be a diamond. But, if it be either of these stones, it is a monstrous specimen and very valuable. Its weight now is about 900 carats, but its specific gravity is almost twice that of a diamond.

THE *European Mail* says that there were never so many gilt, steel, metal and jet pins, combs and buckles seen as now. Beautifully pierced and engraved pins of antique silver, dead gold or dead black are worn in the coiffure for small evening parties and soirées, also metal or strass buckles mounted in silver and set with pearls or coloured stones, and mostly of a long, square or oblong shape. Gold buckles set with strass, and arranged with ribbon loops or bows, or very large pins, with glittering feather-like ornaments, look exceedingly pretty when pinned into the hair.

Prizes for Art Workmen.

THE Council of the Society of Arts have determined, on the recommendation of the Committee of the Applied Art Section, to offer prizes to art workmen under the following classes :—

1. Prizes are offered to art workmen in certain classes of art workmanship enumerated below. These prizes will be awarded to workmen only, and the work must have been executed in the United Kingdom or its dependencies.

2. The objects submitted for competition may be the work of one workman, or of several workmen working in combination. They need not necessarily be the property of the workman or workmen sending them in. Manufacturers or employers may exhibit articles on behalf of their workmen. In this case, besides the name of the manufacturer, the names must be given of all the workmen who have executed portions of the work, with a statement of the portion executed by each. If any prizes are awarded they will be given to the workmen, and a certificate, enumerating the award or awards, will be given to the manufacturer.

3. The objects in each class may be :—(i) Copies of existing works ; (ii) modifications of existing works ; (iii) original works.

4. In awarding the prizes, the judges will take into account the following points :—(i) Originality or beauty of design ; (ii) fitness of treatment ; (iii) excellence of workmanship.

5. Before the award of prizes is finally made the candidates must be prepared, if called upon, to satisfy the Council of their competency.

6. The works will remain the property of the competitor, or of the person from whom he has borrowed them for the competition.

7. Although great care will be taken of articles sent for exhibition, the Council will not be responsible for any accident or damage of any kind.

8. Prices may be attached to articles sent in and sales made, and no charge will be made in respect of any such sales.

9. All the prizes are open to male and female competitors on equal terms.

10. When two or more workmen combine in the production of any article sent in for competition, the names of, and the respective parts taken by, each must be specified when the article is sent in, and the proportions must be stated in which they may have agreed, if successful, to divide any prize which may be awarded.

11. All articles for competition must be sent in to the Society's House on or before Saturday, December 3, 1887, and must be delivered free of all charges. Each work sent in competition for a prize must be marked with the workman's name, or that of the manufacturer, or, if preferred, with a cypher, accompanied by a sealed envelope giving the name and address of the workman or manufacturer. With the articles a description for insertion in the catalogue should be sent. The works will be exhibited at the Society's House, or, if the necessary arrangements can be made, at the South Kensington Museum.

12. The Council reserve the right of withholding any of the specified prizes, or of substituting smaller prizes, or varying in any way their respective amounts. Silver and bronze medals may also be given at the discretion of the judges.

Prizes are offered in the following eight classes for the present year as follows :—

1. Painted glass, £25, £15, £10.*
2. Glass blowing in the Venetian style, £10, £5, £3.
3. Enamelled jewellers' work, £25, £15, £10.
4. Inlays in wood, with ivory, metal or other material, with or without engraving, £25, £15, £10.
5. Lacquer, applied to the decoration of furniture or small objects, £25, £15, £10.
6. Decorative painting on wood, copper or other material, applied to furniture and internal decoration, £25, £15, £10.*
7. Hand-tooled Bookbinding, £25, £15, £10.
8. Repoussé and chased work in any metal, £25, £15, £10.

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* Objects sent in for competition in these classes must not exceed 15 feet superficial. In the case of large works, a portion only (sufficient to give an idea of the whole work) need be sent.

Watchmaking in France.

THE following particulars respecting the manufacture of timekeepers in France, obtained from official reports, have been communicated to the Society of Arts by Mr. J. Tripplin, Representative of the Besançon Chamber of Commerce in London :—

Besançon, in the old province of Franche Comté, situate on the borders of Switzerland, is the centre of watchmaking in France. In 1876, 428,754 watches, of which 296,763 were silver, passed through the hall ; these watches represented the sum of 22,000,000 fcs. The production, which in 1846 was 54,192 watches, has gradually increased, and reached 501,602 in 1883 ; the population of Besançon engaged in the industry being 15,000. The watches manufactured, says Saunier, being good and sound, have conquered for themselves almost the entire French market, formerly tributary to the Swiss ; the Swiss importations having gradually decreased, were reduced to 74,119 watches in 1883. Besançon possesses a school of horology and an observatory, of which manufacturers avail themselves for the purpose of timing watches.

The movements mostly used are made at Beaucourt, Montbéliard, Seloncourt, and the neighbourhood ; these factories produced, in 1876, 1,440,000 watch movements in different stages of finish, besides 400,000 clock movements. Beaucourt itself produced 640,000 watch movements, of the value of 1,500,000 fcs.; Seloncourt, 215,000, and a large number of sets of pinions, of the value of 700,000 fcs.; Montbéliard produced 18,000 escapement bearers, used in carriage clocks ; and in the immediate neighbourhood, at St. Suzanne, 30,000 musical boxes were made—the total watch production amounting to 9,000,000 fcs. What is not kept in the way of watch movements is taken by the Swiss, and almost all clock movements are sent to Paris and Morez du Jura. The total population of the Besançon district engaged in watchmaking amounts to 40,000 : other localities, such as Morteau, where a factory of metal keyless watches exists ; Montécheroux, les Gras, which manufacture largely watchmakers' tools ; les Faucilles, where watch jewels are made ; Maiche, le Russey and district, where cylinders, escape wheels, pallets, levers, screws, &c., are turned out in quantities, are all engaged in the industry.

The village of Cluses, whose working population is about 1,000, produces watch movements, pinions, wheels, wheel cutters, keyless works, barrel arbors, and sundry detached pieces to the value of 1,300,000 fcs., most of which are taken by Switzerland. Cluses possesses also a school of watchmaking of good repute.

Morez du Jura stands first among those districts of France engaged more especially in clockmaking. The working population of Morez and district is 6,000; the total production amounts to 4,000,000, consisting of 70,000 Comté clocks, 20,000 regulators, and some turret clocks.

At St. Nicholas d'Aliermont, near Dieppe, are manufactured carriage and other clocks, chronometers (either in the rough or finished), regulators, &c., to the value of 144,000 fcs.; the working population being 950.

Paris, the cradle of such horologists as Thiout, Antide Janvier, Pierre Leroy, Berthoud, Breguet, and others, manufactures ship's chronometers, regulators, turret clocks ; finishes those French clocks so well known all over the world (whose movements come in the rough from Beaucourt, and whose artistic cases occupy many workers) ; also clock materials, such as anchors, mainsprings, hands, dials, electric apparatus, finished by watchmakers. Paris, besides being the great emporium for the sale of watches, delivered to the trade 250,000 clocks, 300,000 alarums and counters. The working watchmaking population numbers 8,000. It has now a school of horology, which bids fair to outrival its other French competitors.

Trois Fontaines provides enough watch glasses to supply the whole world, and that production was estimated at 1,200,000 fcs. At Rosureux some turret clocks are made.

Saunier, after having deducted from Paris and Besançon the movements supplied by Beaucourt, Mont Céliard, &c., concludes his report in estimating the total watch and clockmaking production of France thus :—

	Francs.
Besançon	20,500,000
Paris	19,500,000
Some small centres, such as Trois Fontaines and Rosureux	1,500,000
Morez and neighbourhood	4,000,000
St. Nicholas d'Aliermont	1,500,000
Beaucourt, Montbéliard and Seloncourt	9,000,000
Cluses	1,500,000
Total fcs.	57,500,000

Jubilee Mace for Louth.

MR. JAMES FOWLER, the Mayor of Louth, Lincolnshire, is giving a mace to his borough as a memento of the Royal Jubilee, and entrusted the order to Messrs. T. & J. Bragg, of Birmingham, who have carried out his ideas with their well-known skill and judgment. The form is long and graceful, the flowing lines of the antique crown being followed in the head, which, moreover, has the wolf rampant of the borough coat in enamel, as also the royal arms of England, separated by decorations in which the rose, thistle, shamrock and sportive dolphins appear in due relation. The knops are enriched by acanthus ornament, laurel, oak and civic emblems. The initials of the donor are given in enamel, as also an enamelled circle with the words, "The Mace of the Borough of Louth." An inscription records the gift, and the work is executed with due regard to its purpose as a permanent specimen of the art of to-day.

THE TRADE MARKS COMMITTEE.—At the meeting of the Parliamentary Committee on Fraudulent Trade Marks on April 29, Baron H. de Worms, who presided, stated that he had attended the Colonial Conference at the Foreign Office in accordance with the instruction of the Committee, and he had now to state that the delegates were unanimously of opinion that the views which he had expressed on behalf of the Parliamentary Committee, as to the expediency of framing in the Colonies some law which should be equivalent to that proposed by the Bill, should be promoted and given effect to. He further stated, in answer to Mr. Howell, that the Trade Marks Committee of the Board of Trade was a departmental committee and did not clash with the present Parliamentary Committee. He then stated that the Board of Trade had received through the Foreign Office a letter from the Swiss Government agreeing to an international registration of trade marks. This showed that the various conventions were being extended as far as possible by Her Majesty's Government, and the Board hoped to get all the countries to agree to an international system of registration. This would very much facilitate the working of the Customs clauses of the present Bill, and prevent the frauds which existed. The Committee then proceeded to examine some Lancashire witnesses as to the prevalence of false marking. A significant incident occurred during the sitting. A practical watch case maker having stated in evidence that foreign watches were frequently stamped with the English Hall-mark, fitted abroad with foreign works, and then sold in this country as English-made watches, Baron Henry de Worms produced his own gold watch, which he understood was of English manufacture, and for which he paid a large sum, and asked the witness to explain the difference between an English and a foreign watch. Considerable amusement was caused when the witness told the owner that his watch was not an English one, and the Baron remarked that the incident showed the necessity for the Bills at present under the consideration of the Committee.

Civic Mace for Cheltenham.

An interesting mace in silver, richly enamelled and gilt, has just been manufactured for Cheltenham by Messrs. T. & J. Bragg, of Birmingham. It is to be presented, together with a subscription portrait, to Mr. George Parsonage, now and for several previous years mayor of the borough, and will be by him re-presented to the town as a memorial of the Royal Jubilee. The head of mace has the eight bars of the Imperial crown, surmounted by the ball and cross over it; the arms, crest and motto of Cheltenham in full enamel blazon occurs on one side, while the arms, crest and supporters of England are given in repoussé and enamel work on the reverse. The intervening spaces on the head of mace are occupied with natural emblems in repoussé, surrounding two oval medallions: one of these, adorned with fountains, springs of water and the serpent-twined staff of Esculapus, refers to Cheltenham as a health resort; the other, having books and educational symbols, the lamp of learning and Minerva's owl, refers to its famous schools. The column of the mace is elegantly divided by a series of knops, so arranged as to be convenient for holding or for carrying erect—all enriched with suggestive decoration. The rose, the oak, the heraldic indication of a fountain with the leaves of water-plants of various forms, all combine harmoniously in the design, while the enamelled monogram of the mayor in the larger knop has opposite to it the inscription recording the gift. The work is well considered throughout, and the piece is one of the most remarkable of the modern maces which have been lately produced by the firm.

The Ruby Mines of Burmah.

In view of the expedition now being carried on in this district, under the command of General Stewart, the following description from a correspondent of the *Daily News*, who is intimately acquainted with the region, will be of interest:—Owing to the very great jealousy of the Burmese Government, the ruby mines have been carefully guarded from all strangers, and from this cause our knowledge regarding them is very small. The mines are said to be only about 60 miles north-east of Mandalay, and the ground lies to the east of the valley of Irrawady, from which it is separated only by the Shuedoung Mountain range. According to Burmese accounts, the spot is surrounded by nine mountains, and it must be a valley of some extent; for, although uneven, it is full of marshes or lakes, of which there are said to be seventeen. From this description it is not likely to be a healthy spot. The principal villages near to the mines are Katheyuwa, Kyatpen, and Mogouk. The extent of ground over which the rubies exist has not been precisely ascertained, but it is believed to extend at least over 100 square miles. The road generally used for communication with the mines starts from Tsinguhmyo, on the left bank of the Irrawady. This route passes through Shuemale. There are other routes, but they are not so well frequented. The value of these mines was reported a few years ago to be annually from about £12,000 to £15,000 sterling; but this includes sapphires and other stones as well. The mines were wholly Royal property, and the stones were a monopoly of the king. From this it may be assumed that the Indian Government will now claim the ruby mines. The "gem-bed," as it is called, or strata in which the rubies are found, varies considerably at different points in its depth. Pits are sunk down vertically till a gem-bed has been touched, and then horizontal galleries are formed through it. These strata differ considerably in thickness; sometimes they are only a few inches, while in others they are found several feet in depth. The earth of the gem-bed is brought up to the surface, where it is carefully washed, and the gems are secured. Most of the rubies are small, but large ones do at times turn up; the difficulty is to find large ones without a flaw. The lapidaries, or gem-polishers, are in the capital, and not at the mines. The polishing process is performed by pounding the smaller gems and worthless stones. These are pounded and mixed with other substances, and formed into cakes about 10 in. long and 4 in. wide. The good rubies are rubbed on this. When the stone has been ground down roughly on this, a finer cake is employed, and the finishing touch to the gem is given by rubbing it on plates of brass or copper. Sapphires are also found in the same strata with the rubies. The people employed manage to secrete small stones, and these are smuggled from the mines to the capital.

New Book.

ELECTRO-DEPOSITION OF GOLD, SILVER, COPPER, NICKEL, &c., &c.* By Alexander Watt. This is a comprehensive work intended, as stated in the preface, to furnish those who are engaged in the electro-deposition of metals, and in the equally important department of applied science, electro-metallurgy, with a complete treatise, embodying all the practical processes and improvements the progress of science has up to the present time placed at our command. The book, which comprises over 500 pages, is thoroughly practical in its aim, the more scientific portion of the work being treated in such a manner that those who are not deeply learned in science can readily comprehend the chemical and electrical principles of electrolysis—a knowledge of which is indispensable to all who would practise the art of electro-deposition with economy and success.

The name of the author is well known in connection with a previous work on electro-metallurgy, several chapters on which subject are included in the present treatise; and the popularity of the former book is a guarantee of the value of the one under notice.

The text is elucidated throughout by numerous capital illustrations, and the last chapter, several useful tables and a list of other existing works relating to electro-deposition, form a convenient kind of appendix.

The practical value of the work as a book of reference is further greatly enhanced by means of a very complete index, and we cordially recommend it to our readers' notice.

A DARING series of burglaries were committed on Sunday, May 1, on the premises of Messrs. Bennett Brothers and Hudson Brothers, Ludgate Hill. The burglars, three in number, by some means obtained an entrance into the premises of Messrs. Samuel Brothers, in the Old Bailey, and, breaking through a 9-inch brick wall, made their way into Messrs. Bennett's, where they cut open the top of a Tann's safe (in which, however, there was no money), and also the back of a Hobbs' safe, which contained a comparatively small amount of cash. Before breaking open the Hobbs' safe they had drilled eight holes in the front of it without succeeding in forcing the lock. From Messrs. Bennett's the burglars, after completely ransacking the premises, took away silver, jewellery and some cutlery to the estimated value of £100.

IT is reported that two of the seven lost Mexican bonanza mines have been discovered. In 1756 the Indians swept over Northern Mexico and destroyed Chihuahua, and all the miners were driven out. The Indians held control of the country so long that all records were lost. Recently Lieutenant Kipper, formerly of the United States army; W. K. Glenn, of Illinois; Captain Allen and J. McIntyre, of Chicago, went out on a surveying expedition in the interest of a Sonora land company, and in an old chapel found maps and other data. McIntyre's party located what is believed to be the "Layopa" silver mine. It is in the midst of thousands of ruined buildings, among large churches and forts. Within a radius of four miles are 420 workings, old Spanish furnaces and tons of slag. A few days later another party reported the discovery of the Guayanopa in the heart of the Sierra Madre mountains. Around it are the ruins of 118 rastoras. A great placer field has been located where the Jesuits of 200 years ago found fortunes for the Church.

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* London; CROSBY, LOCKWOOD & CO., 7, Stationers' Hall Court, Ludgate Hill, E.C.

Hand Turning in Watchwork.

By Henry Bickley.

It should be the fixed object of every young man who wishes to become a watchmaker to master the art of turning; not only because it will enable him, if a jobber, to work in new pieces with skill and precision—in itself an object worth striving for—but also because, in the process of learning to turn, the eye and the hand receive an education unattainable by any other means. A thorough conception of form and truth, as well as delicacy of touch, are the outcome of the art of turning. Think how much the watchmaker's art is dependent on the possession of these qualities, and but what a poor representative of the trade must he be who has them not!

Turning, like all other branches of skill, can only be mastered by slow and patient effort, plodding onward step by step from the beginning. No hurry, no slurring of difficulties, but patiently attacking and vanquishing each as it arises. For want of proper grounding in the preliminary stages many men are never able to turn at all in the proper sense of the word. Badly taught, most likely, in the first instance, with no clear idea of what is required, and deprived of the practice without which they can never succeed, they rush forward, evading the difficulties in their way instead of surmounting them, till the goal of their ambition, a balance staff, is reached. It is unnecessary to say that the staff is usually a very bad one; its merits being quite undiscernible to any but the maker. He, however, is decidedly proud of the job. Has he not gained his ambition, what more is there to learn? And so he quietly subsides. This is no fancy picture. I have come across many such persons, who, when put to the test, have been unable to do anything, even to the making of a screw, in a satisfactory manner.

There is no better mode of learning to turn than to practise first of all in soft steel or even brass till proper command is acquired of the graver and bow. The latter should be tolerably strong to begin with, with good-sized steel wire and a large ferrule and graver. Then let the learner try to make a big screw, taking another screw as a copy. The wire must first be centred quite true, starting on the filing block and finishing on the centreing runner, and a pivot turned on it to form the screw top. The graver must be held firmly on the rest at a point slightly above the centre of the wire. In this apparently simple piece of work, if persevered in till it is properly done, the learner will take in four valuable lessons. He will learn in the first place to turn straight, as the pivot must be so formed if a proper thread is to be put on it; secondly, he will learn to turn squarely in forming the shoulder for the back of the screw head; thirdly, he will learn to turn to size, if he makes the screw tops, as he should do, to fit a certain hole in the screw plate; and lastly, and most important of all, he will learn to turn true. On this latter point I think it well to make a slight digression, having met with a strange confusion in some minds as to what constitutes truth in turning. We speak of a piece of work as being true when its circumference forms as nearly as possible a perfect circle—in other words, when it is round. Now as the truth of the work as left from the graver depends entirely on the centres, it follows that if they are not round neither will the work be; especial care must therefore be taken to fix the centres in the first instance. Lay the end of the piece on the centreing runner, giving it a good speed with the bow, then turn along it for a short distance and carefully observe it; if the centre and the part turned over do not seem round, turn and centre it again. If the piece be much out of round, turn off the extreme point to form a new centre before running it with the file, repeating the operation till perfect truth is obtained. This must of course be done to both centres, and frequent observation made of them during the progress of the work. Want of care and observation, even at the last moment, may cause a good piece of work to be spoiled; for if the centres should get but the slightest degree out, the part turned last—which in a finished piece is always the pivot—will be oval, and its effectiveness, in any case seriously diminished, will, in a balance staff be destroyed. Thus far as to centres and centreing. This little digression will not be lost, as I have met with inexperienced persons who have thought and argued that, because a thing is true to the centre it must of necessity be true, a fallacy that in some instances had taken deeper root than I should have thought possible.

But to return to the screw making. From large screws the learner should gradually pass on to small ones, adapting his bow and ferrule to the work as he goes along; and when he can make a jewel screw quite true, with a good thread, and a well-shaped head with the shoulder at the back turned clean and square, without either lump or nick in the corner, he may think, as regards soft metal, that he has done very well. It seems in some respects a pity that material for repairing is now so easily obtained. In days gone by, when screws were wanted for jobbing (and for new work, too, for that matter) they were made by the apprentice, who, by this means, got an amount of useful instruction and practice in turning he does not get now. I know I shall be told that to make screws when they can be bought for almost next to nothing does not pay, that time is money, and so forth. To this I reply that skill must be paid for in some shape or other, that youth is the time to acquire it, when the perceptions are quick and time not so valuable as afterwards, and that if the young watch jobbers of to-day are to learn turning at all, they must do as all the best men in the trade have had to do—begin at the beginning. Besides, to take the matter on its merits, I am not sure that it would not often be cheaper to make screws than to buy them. The screws, as we get them, usually want so much alteration, that to one who can handle his tools the making of a screw would take very little if any longer than the fitting of one.

Having so far mastered the making of screws, the learner may now try his hand at tempered steel, following much the same procedure as with the soft metal. A piece of good-sized steel wire should be rough centred on the filing block, hardened and brought back on the blueing pan till tolerably soft. A light blue colour will give about the right temper: if left harder than this it will be liable to glaze easily and give trouble. After centreing it in the manner just described, turn a good-sized pivot with the point of the graver, keeping it straight and the shoulder clean and square. Begin with pivots as large as the No. 10 hole in Latard's screw plate, and do not reduce them in size till able to make them of a good shape with the point of the graver, smooth and quite true. Then gradually make them smaller, proceeding by easy stages till the smallest sizes are reached. The same remarks apply to conical pivots as to straight ones—the learner must begin with large ones and gradually work his way, striving in all cases to produce the exact shape required. Not only pivots, but all the different forms to be seen on staffs and pinions, such as back slopes, hollows, &c., should be practised on rough steel. One of the most difficult lessons for the learner is the turning in of pieces, such as staffs and pinions, to exact height or length to meet an endshake. It is very mortifying, when the piece is completed, to find that it is too long or too short, and very elaborate and ingenious gauges have been constructed to overcome this among other difficulties. But it is at least doubtful if some of these instruments are not calculated to make the learner's troubles greater instead of less. Gauges, to be really useful, must be simple; and it may be said of them, almost more than of any other tool, that there is as much in the use as in the construction. There is really but one way of meeting these difficulties, and that is by attacking them systematically. It is too much to expect that a youth, so soon as he can hold a graver, should be able to execute work requiring great nicety of judgment, even with the aid of the finest gauges. Let him take an old frame and practise fitting pieces by copying the old staffs and pinions. The pinion gauge, or a space filed in a piece of sheet brass, will be the only gauge necessary at first.

Take one of the pinions that has a proper endshake in the frame and measure off the distance between the pivot shoulders; if the endshake is wrong, adjust the gauge to correct it. Then turn pivots on either end of a piece of steel, with the shoulders a proper distance apart to fit the gauge. The correctness of the height will of course be proved by trying it on the frame. Only large pivots should be made at first, and, the height having been struck in the gauge, care must be taken in turning the pivots not to back the shoulders. It is just at this point that learners generally fail: in turning the pivots they cut into the shoulders and get the piece too short, or, anxious to avoid this, they allow for it and leave the piece too long. It is work, as I have said, calling for nice judgment with a keen appreciation of trifles, and must be gone over many times before the worker becomes thoroughly familiar with it. Making a pallet staff to a full-plate lever watch is capital practice in this kind of work. Before knocking out the old staff, take accurate measurement of the height of the top pivot shoulder above the lever, also of the length of the staff between the two shoulders. Take a thin piece of tempered steel wire and turn it down a sufficient length to form the staff, fitting it to the hole in the pallets and keeping it slightly taper; polish and glass burnish it; then gently drive it tight into the pallets and mark off the height for the top shoulder; remove the pallets and make the pivots, being careful that they fit the holes with very little sideshake. The next step should be to practise making pivots, straight and conical, to jewel holes. The pivots, to be quite true, must be turned the exact shape, and, as nearly as possible, to the right size before being polished or burnished.

All this should be preliminary to making balance staffs, fitting cylinders and such like ambitious efforts; so that, when these higher parts are reached, the ground round about will be so far cleared as to make their accomplishment comparatively easy. It has been said that no one can claim to be master of an art till he can play with it. As applied to watchmaking this can only be a half-truth, as our work is not of a kind to be played with. But, stated in another form, the idea is true enough: for in watchmaking, as in other things, mastery only comes with a complete loss of self-consciousness, when, from long and constant practice, the faculties move together in unison without apparent effort. To all, therefore, who would excel in turning, my last words would be:—begin at the beginning, make sure of each step as you advance, and work away.

Workshop Memoranda.

Soldering Aluminum.—Aluminum may be soldered by means of solders of tin and zinc, or of tin, bismuth and aluminum: those of tin and aluminum are to be preferred. According to the working which the soldered pieces have to undergo, the solders must have different compositions. If the metal is to be moulded, an alloy of 45 parts of tin and ten parts of aluminum should be used, which is malleable enough to withstand the hammering. Pieces which are not to be further worked are easily soldered with an alloy of tin and a less quantity of aluminum. The process is the same as in soldering tin-plate, or it can be effected still better with a flame.

German Silver.—The following is a good mixture for fine German silver:—

Copper	49	parts, by weight.
Zinc	24	,, ,,
Nickel	24	,, ,,
Aluminum ...	$2\frac{1}{2}$	,, ,,

Nickel-plating Zinc.—A process for nickel-plating zinc is described in the *Journal of the Society of Chemical Industry*. The zinc is cleaned by dilute hydrochloric acid and thoroughly washed. It is then hung in the nickel bath for a short time, and on taking out is rinsed and thoroughly scraped, so removing all that does not adhere firmly. This is repeated till the zinc is covered with a thin film of nickel, which can afterwards be made as thick as required. The suitable current strength is easily found. When the zinc is once thoroughly covered the current may be increased without any risk of peeling off. Another process is described by the correspondent of a German contemporary. He says it can be successfully and easily accomplished by first dipping the zinc in mercury. A fine plating of the nickel can then be secured on the zinc with even a feeble galvanic current, durable and susceptible to the highest polish.

Tempering Steel.—Monsieur P. Gabriel gives the following method of tempering steel in the *Revue Chronometrique*:—Cyanide of potassium is dissolved and red heated in a metallic or earthen crucible; the pieces of steel are then immersed in the liquid until red, and afterwards plunged in water. This process is said to give great satisfaction, and many advantages are claimed for it. The temper is said to be harder, and if a finished piece is under treatment the polish is not lost. It will show a greyish tint, but the original polish will reappear immediately if a piece of polished wood with the finest rouge is passed over it. It is also said that if the steel has been well annealed, and not put out of shape by the file or the hammer, it will come from the crucible perfectly straight; arbors four or five centimetres long are not deformed if tempered by this method. It is recommended as particularly advantageous for tempering small steel springs, &c.

Aluminum alloyed with a small percentage of silver loses much of its malleability, but with 5 per cent. of silver it can be worked well and takes a more beautiful polish than the pure metal. With 3 per cent. of silver it is very suitable for philosophical instruments, being harder and whiter than the pure metal, and is not tarnished even by sulphuretted hydrogen. With small amounts of silver it appears very suitable for scale-beams and is now frequently used for this purpose. The alloy, containing 5 per cent. of silver, has often been suggested for coin of small denominations, as it is hard, bright, and retains its lustre in handling.

Ivory Rules and Scales may be cleaned well by scrubbing with a new soft tooth-brush, soap and tepid water; then dry the ivory and the brush, dip the latter in alcohol, and polish the ivory until it has regained its former polish. If the water has given the ivory a yellowish tint, dry in a heated place. If the ivory has grown yellow with age or careless handling, it can be bleached by placing it under a glass bell, with some chloride of lime and muriatic acid in a small vessel, and setting the whole thing in the sunshine. Care must be taken not to inhale the fumes of the acid as it works on the lime. The bleaching qualities of the chlorine destroy the yellow colouring matter in the surface of the ivory, and it resumes its original white tint.

Whitening Silver Articles.—The following recipe is given in an American contemporary:—Silver articles which are required to be left a dead white should be thus treated: The article is first to be heated to "cherry redness" (that is, to a dull red heat), and is then to be allowed to cool. When quite cold it is to be placed in a pickle of very dilute sulphuric acid (about five parts acid in 100 parts water). It should remain in this pickle for an hour or two, and if the surface is not sufficiently uniform it should be rinsed in hot water, left to dry, and again heated as before, the operation of pickling being repeated. The object in this process is to remove the copper with which the silver is alloyed, and the repeated pickling will not produce any injurious result, but will merely remove the copper from the surface of the article, leaving fine silver alone exposed upon it. A solution of alum in water may be substituted for dilute sulphuric acid, if preferred. In either case the solution should not be used more than once or twice. After the article has been whitened as above it must be removed from the pickle, and be well rinsed in hot water, which for this purpose must be absolutely clean, and then placed in warm box-sawdust. It is well to keep perfectly clean box-dust for articles which have to be whitened, as in some cases the slightest stain will be fatal to the object sought. In whitening silver watch-dials great care must be taken not to warp them in the process of annealing. The dial should be placed upon a perfectly flat piece of charcoal, face upward, and a gentle blast with the blow-pipe carefully applied. As far as practicable the flame should play all over the surface of the dial without absolutely touching it, by which means the dial will soon become sufficiently heated without becoming warped or in any way injured. Silver dials may also be annealed by placing them upon a flat sheet of copper, which is then brought in contact with a clear fire until red hot.

Meetings of Societies, &c., for the Month.

Societies.	June.
Photographic, 5*a*, Pall Mall East	14
Society of Arts, John Street, Adelphi	*29
Geological, Burlington House	8, 22
Numismatic, 22, Albemarle Street	*16
Mathematical, 22, Albemarle Street	9
Royal Astronomical, Burlington House	10
Royal Meteorological, 30, Great George Street	15
Geologists' Association, University College	3
Royal Microscopical, King's College	8
Quekett Microscopical Club, University College	10, 24
British Archæological Association, 32, Sackville Street	1
Royal Archæological Institute, Oxford Mansion, Oxford Street, W.	2
Royal, Burlington House	16
Antiquaries, Burlington House	9, 16, 23, 30
Physical, Science Schools, South Kensington	11, 25

APPLICATIONS FOR LETTERS PATENT.

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

5.862. W. Blenheim, Egham. for "Simultaneous driving of a number of clocks by magneto-electricity." Dated April 22, 1887.

6,011. W. W. Philp. London, for "An improved watch swivel." Dated April 25, 1887.

6,183. E. Trow and R. J. Lewis, Birmingham, for "A solitaire for shirt wristbands, cuffs, fronts and shirt collars." Dated April 28, 1887.

6,226. F. Knoeferl, London. for "Improvements relating to watches or timekeepers." Dated April 28, 1887.

6,337. W. S. Harrison, London, for "Improvements in or applicable to synchronising mechanism for clocks." Dated April 30, 1887.

6,408. C. Adam and R. Adam. London, for "Improvements in chronometer movements." Dated May 2, 1887.

6,617. J. J. Garrard, London, for "The adaptation of studs and buttons to neckties, other articles of wearing apparel and boots, and a method of fixing the same." Dated May 5, 1887.

6,662. J. Robinson. London. for "Improvements in apparatus for winding up keyless watches." Dated May 6, 1887.

6,663. J. Robinson. London, for "Improvements in apparatus for winding up keyless watches." Dated May 6, 1887.

6,771. T. Watkins, Birmingham, for "Putting together of brooches, earrings and other articles of jewellery." Dated May 9, 1887.

6,931. C. F. Veit, London, for "Improvements in studs and solitaires: applicable also for other purposes." Dated May 11, 1887.

7.056. W. E. Patterson, Birmingham, for "Improvements in solitaires, cuff and shirt studs, and other like dress fasteners and ornaments." Dated May 14, 1887.

7,103. S. Walker, Liverpool. for "Improvements in watches." Dated May 16, 1887.

7,115. C. Humbert. London, for "Improvements in or appertaining to the dials of watches and clocks." Dated May 16, 1887.

7,176. B. J. B. Mills, a communication from F. Mallet-Guy, France, for "Improvements in the manufacture of gold and other metallic twist or bullion." (Complete specification.) Dated May 17, 1887.

7.248. J. Robinson, London, for "Improvements in the construction of watches for the prevention of over-winding." (Complete specification.) Dated May 19, 1887.

7.278. J. S. MacArthur, R. W. Forrest and W. Forrest. Glasgow, for "Improvements in treating ores to obtain gold, silver, lead, zinc, copper and other metals, or useful compounds thereof." Dated May 19, 1887.

7,321. L. C. H. Mensing, London, for "Improvements in studs, cuff solitaires and similar articles." Dated May 19, 1887.

Recent American Patents.

Clock, Advertising. Feldman & Reese, Jun.	360,955
Clock, Calendar. H. S. Prentiss	360,725
Clock, Electric Pendulum. A. L. Parçelle	360,903
Clock Mechanism, Auto-Pneumatic. P. G. Puttemans	360,481
Clock, Repeating Mechanism. E. Y. Judd	360,888
Clock-winding Mechanism. A. Robinson	361,837
Combined Clock and Alarum for Hotels. A. B. Harford	361,511
Cushion-securing Device for Spectacles. G. W. Wells	361,386
Earring. A. Luthy	361,769
Ear Wire and Catch. W. C. Edge	360,423
Gold Mining Device. A. Mendenhall	360,713
Jewellers' Rolls for Enlarging Rings. J. C. Rocheleau	361,084
Jewels, Tool for Setting Pallet. S. T. J. Byam	360,416
Metals from Ores or Alloys, Apparatus for Separating. H. R. Cassel	360,852—360,853
Micrometer Gauge. A. H. Emery	361,055—361,056
Musical Box. J. Billon-Haller	361,043
Ore Pulveriser. E. C. Griffin	360,682
Pendant Stem for Watches. H. Rohrdantz	361,597
Regulator Pin for Watches. A. Van Straight	361,850
Thermometer Oven. D. G. Cooper	360,950
Watch Case. A. H. Potter	360,475—360,819
Watch Case, Design Patent for. D. E. D. McMurray	17,280
Watch Case, Design Patent for. F. Rapp	17,284
Watch Case and Movement Plate Combined. A. H. Potter	360,477
Watch Case Centre and Pendant. A. H. Potter	360,478
Watch Case Spring. N. J. Felix	361,752
Watch Dust Band. D. Gruen	361,625
Watch Escapement. A. H. Potter	360,474
Watch for the Blind. S. F. Adam	360,641
Watch Key. G. Hoffman	361,627
Watch Key. G. S. & W. W. Conover	360,563
Watch Movement Frame and Case Body Combined. A. H. Potter	360,476
Watch Plates and Cases, Manufacture of. A. H. Potter	360,818
Watch, Stem Winding and Setting. S. T. J. Byam	360,415
Watch, Stop. G. B. St. John	360,828
Watch, Stop. H. A. Lugrm	360,777
Watches, Adjusting Hair Springs of. L. R. Kaufmann	360,701

A printed copy of the specifications and drawing of any patent in the American list, also of any American patent issued since 1866, will be furnished from this office for 2s. 6d. In ordering, please state the number and date of the patent required, and remit to J. Truslove, Office of *The Watchmaker, Jeweller and Silversmith*, Imperial Buildings, Ludgate Circus, E.C.

London Bankruptcy Court.

Re W. H. Peake.

THE public examination of this debtor was concluded last month. The debtor was a manufacturing jeweller, of Gerrard Street, Soho, trading as Grant & Peake, and recently failed with gross liabilities £123,485, of which £89,285 is unsecured, and assets £29,911. At the first meeting the creditors agreed to accept a composition of 6s. 8d. in the £, payable in four instalments extending over sixteen months, secured by cash creditors to the extent of £44,000, withholding their claims until the other creditors had recovered their dividend. Mr. Lee Nichols, Mr. Aldridge, Mr. Theodore Lumley, Mr. W. A. Colyer and others appeared in the case.

Gazette.

Partnerships Dissolved.

Hall & Goode, Bartlett's Buildings, silver jewellers. B. Lines & Son Birmingham, gold plate manufacturers. John Grinsell & Sons Birmingham and Charterhouse Street, City, silversmiths, so far as regards John Grinsell. S. Lingard & Co., Birmingham, manufacturing jewellers. Tanenberg & Sons, Leeds, watchmakers, so far as regards S. Tanenberg. Laurence & Payne. Birmingham, silver chain makers. Sills & Co., Coventry, silver-platers. Jacobs & Robinson, Ton-y-pandy and Pen-y-graig, pawnbrokers. S. J. John & Sons, Birmingham, gold chain manufacturers.

THE BANKRUPTCY ACT, 1883.

Receiving Orders.

To surrender in the Country.—Ferdinand Henry Tritschler, Carlisle, jeweller. James Goodrick Needham, Sheffield, watchmaker. Isaac Batten, Penzance, watchmaker. George William Barrow, late Cheltenham, jeweller. Thomas Elliot, Preston, watchmaker. Richard Henry Cheetham. Southampton, cutler. Edward Welbourne, Ilkley, jeweller.

Public Examination.

In the Country.—T. Elliot, Preston, watchmaker; June 10, at 11.

Notice of day for proceeding with Public Examination.

In London.—A. Jack, Cheltenham, jeweller; June 10, at 11.30.

Adjudications.

In London.—S. Thomas, Albemarle Street, Piccadilly, jeweller. T. W. Harris, Brook Street, Grosvenor Square, jeweller. W. George, King Square, Clerkenwell, manufacturing jeweller.

In the Country.—F. H. Tritschler, Carlisle, jeweller. G. Needham, Sheffield, watchmaker. G. W. Barrow, late Cheltenham, jeweller. T. Elliot, Preston, watchmaker. I. Batten, Penzance, watchmaker. E. Welbourne, Ilkley, jeweller.

Notices of Dividends.

In London.—A. C. Alais, Beauclerc Road, Hammersmith, engraver; 1s. 6d., first and final; any day except Saturday, Chief Official Receiver, 33, Carey Street. J. N. Harmer, High Street, St. John's Wood; 6½d., first and final; any day except Saturday, Chief Official Receiver, 33, Carey Street. M. Rosenberg (trading as Oswald Rosenberg), St. Paul's Road, Canonbury, wholesale jeweller; 2s., first; any Wednesday, Seear, Hasluck & Co., 23, Holborn Viaduct.

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* Anniversary Meetings.

Correspondence.

All Letters for Publication to be addressed to the Editor *of* The Watchmaker, Jeweller and Silversmith, *Imperial Buildings, Ludgate Circus, E.C.*

All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.

To the Editor of *The Watchmaker, Jeweller and Silversmith.*

[KEW CERTIFICATES.]

Sir,—Will you allow me to refer to your remarks upon my letter on the above subject in this month's issue of the *Watchmaker, Jeweller and Silversmith?* I am equally desirous with yourself that he who has won shall bear the palm, and for that reason I directed attention to the fact that eleven of the first twenty certificates were obtained by Swiss watches. Such being the case, wherein, then, is the much vaunted superiority of English watches? In the Kew trials they are beaten by the Swiss watches. Do the Swiss watches also give better results in the pocket? That is the point of my question. Are the Kew tests a measure of the probable performance of the watch in use? I believe Mr. Whipple says Swiss watches give better results at Kew than the English; and at the Melbourne Exhibition, a few years ago, the Swiss watches took the lead.

I am, Sir, your obedient servant.

B. Arnold.

72, Baker Street, W., *May* 5, 1887.

P.S.—In your criticism of my letter you say two Swiss makers (Messrs. Baume & Co. and Messrs. Stauffer & Co.) obtained nine certificates out of the first twenty. This is more surprising and creditable than that all the Swiss makers together obtained eleven out of the first twenty.

[HALL-MARKING OF WATCH CASES.]

Sir,—Now that the Select Committee of the House of Commons, appointed to consider "The Merchandise Marks Act Amendment Bill," has examined the witnesses on the clauses of the Act that relate to the Hall-marking of watch cases and other matters connected with the sale of foreign-made watches as English, and as it is probable that some legislation will result from whatever report this Committee may make, it behoves all those whose interests would be affected to see that such legislation will not be mischievous, if, indeed, it is nothing worse.

The interest watchmakers have in this fraudulent trades' marks question is of much less importance than that of other trades, and therefore the Committee has not been selected in consequence of its intimate acquaintance with the state of the trade or the requirements of watchmakers; and it is pretty certain that if this Committee formulate and recommend to Parliament any scheme based upon the evidence of the witnesses they have examined, and from some other sources, such a scheme, if allowed to pass into the statute books, will not only be mischievous, but may be disastrous to the manufacturers of English watches. The clauses in the present Bill are sufficient to satisfy any reasonable person of the character of other clauses emanating from the same source: they are quite impracticable, but if it were possible to carry them out with anything like strictness, such a law would soon crush out what little trade the English watch manufacturer has left.

It is not, however, my present purpose to discuss the proposals put forward by the gentlemen that have given the Committee the benefit of their advice. I want to point out that the authors of the various remedies proposed to the Committee, and resolutions passed at various meetings, are not the representatives of the watch trade, and that it is now time for those who do represent it to bestir themselves and make their views known to those Members of Parliament who take an interest in the subject, or who represent watchmaking centres, as it seems impossible to get watchmakers to meet and come to any joint agreement.

A special meeting of the trade was called on March 28, by the London Chamber of Commerce, to discuss the "Hall-marking of watch cases," but instead of the *trade* being present, the meeting was composed principally of foreign watch importers, and, judging from their speeches, they were very well satisfied with the present state of things, although very indignant at the suggestion of its leading to any fraudulent transaction. From some reason which the chairman, Mr. Streeter, did not explain, the meeting was adjourned, although it would have been quite easy to have passed a resolution that would have expressed, not the opinion of the *trade*, but that of the gentlemen referred to.

At the adjourned meeting (to which some of those who had been asked to attend the first meeting were not invited) a resolution was agreed to which in no sense expressed the opinion of the trade, but it would go to the Parliamentary Committee with all the weight of a resolution passed at the London Chamber of Commerce; and from such materials the Committee would be likely to form their report.

I would therefore ask all those who have any faith or fortune in English watchmaking to exert themselves and prevent their functions and influence being usurped by a set of busybodies whose activity is promoted by their self-interests or supposed interests, and whose views are narrow in consequence.

Yours, &c., "Vigilant."

Buyers' Guide.

The Sheffield Smelting Company, Sheffield. *Sell* Gold and Silver (pure and alloyed). *Buy* all materials containing Gold and Silver.

F. W. Powell (now **Fowler & Powell**), Colonial Buildings, Hatton Garden, E.C. Wholesale only for Gold and Silver Jewellery; Silver Cigar, Cigarette and Card Cases, Match Boxes, Salt Cellars; Silver and Glass Smelling Bottles; Sovereign Purses.

Jones, E. A., Wholesale Manufacturer of Whitby Jet Ornaments. A Large Assortment of the Newest Patterns always in Stock. Export Orders promptly executed. Persons not having an account open will avoid delay by forwarding a reference with their order. Customers' Matchings and Repairs with despatch. 93, Hatton Garden, London, E.C.

For cheap, quick, reliable Watch and Jewellery Repairs, by the most Experienced Workmen, send to Alexander Edwards, Watch Material and Tool Dealer, 88 & 89, Craven Street, and 2, Holyhead Road, Coventry. Lists: all Horological Literature.

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NOTE.—The Subscription will be opened on Monday, the 4th April, and will close on Thursday, the 7th April.

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This Company has been formed to take over the Leasehold Premises, Property, Stock, Plant, Goodwill, and Business of S. Blanckensee & Son. From a small beginning the business, which was established by the father of the present partners 60 years ago, has gradually increased, and is now one of the largest in the trade.

The chief manufactory is at 14 and 15, Frederick Street, Birmingham, and there is a branch establishment at 35, Ely Place, Holborn, and a manufactory and warehouse at 17, Calle Espox-y-Mina, Madrid.

The business is entirely wholesale, and includes the manufacture of all kinds of high-class, fine gold jewellery, diamond mounting, mayors' chains, caskets, medals, masonic jewellery, and the best gem-set work. The firm have for many years successfully competed with London and Paris-made goods, both in design, style and finish : to meet the demand for this class of jewellery they opened three years ago their branch establishment in London.

The Company will take over the business, leasehold properties, goodwill, assets and liabilities as and from February 1, 1887. The purchase price is £70,896, which includes £20,000 for goodwill. The Vendors have agreed to accept this amount by £30,000 in "B" or Deferred Shares, £10,000 in "A" Shares, and the balance, £30,896, in Cash by instalments.

The balance sheet of the Firm at February 1, 1887, which forms the basis of the purchase, has been examined by Mr. Boardman, of Messrs. Chadwicks, Boardman & Co. The Vendors guarantee the correctness of this balance sheet and the stock books, and agree to make good any deficiency or loss in the realisation of the debts taken over by the Company.

The Vendors have given the best possible proof of their confidence in the future success of the Company by agreeing that if the net profits in the first five years do not amount to 40 per cent., or an average of 8 per cent. per annum on the amount of the Preference and Deferred Shares, paid up or taken as paid up, the Deferred Shares will be absolutely cancelled. But if the net profits amount to 50 per cent. on both classes of Shares in the first five years, or any less period, the Deferred Shares shall be converted into Preference Shares.

The business of the Firm in the repairs of jewellery, and the setting and resetting of precious stones, is believed to be the largest in England.

The stocks of manufactured jewellery, diamonds, precious stones, and materials have been examined on behalf of the Directors by Mr. E. J. Watherston, the well-known jeweller and goldsmith, of Pall Mall, London, who has reported "that they are valued at a fair and proper price as between an outgoing and an incoming partner. That no items of own manufacture have been taken at more than cost price of material and labour, that no purchased goods have been taken at more than purchased price, and that in all cases of old stock and stock not in current demand a proper deduction has been made."

The only Agreement entered into is : The Purchase Agreement.

Copies of the above-mentioned Agreement and of the Articles of Association can be seen at the Offices of the Solicitors, and full Prospectuses and Forms of Application may be obtained at the Offices of the Company, 14 and 15, Frederick Street, Birmingham, and 35, Ely Place, Holborn, London, E.C.; and also at the Head Office, Birmingham, and Branches of The Birmingham, Dudley and District Banking Co., Limited, the Bankers of the Company, and at their London Agents', Messrs. Barclay, Bevan, Tritton & Co., 54, Lombard Street ; and from MESSRS. CHADWICKS, BOARDMAN & CO., 36, Coleman Street, E.C., and 64, Cross Street, Manchester.

LONDON, *March* 31, 1887.

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